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THE TASHKENT EARTHQUAKE (SELECTED CHAPTERS). PART 2.(U)
SEP 76

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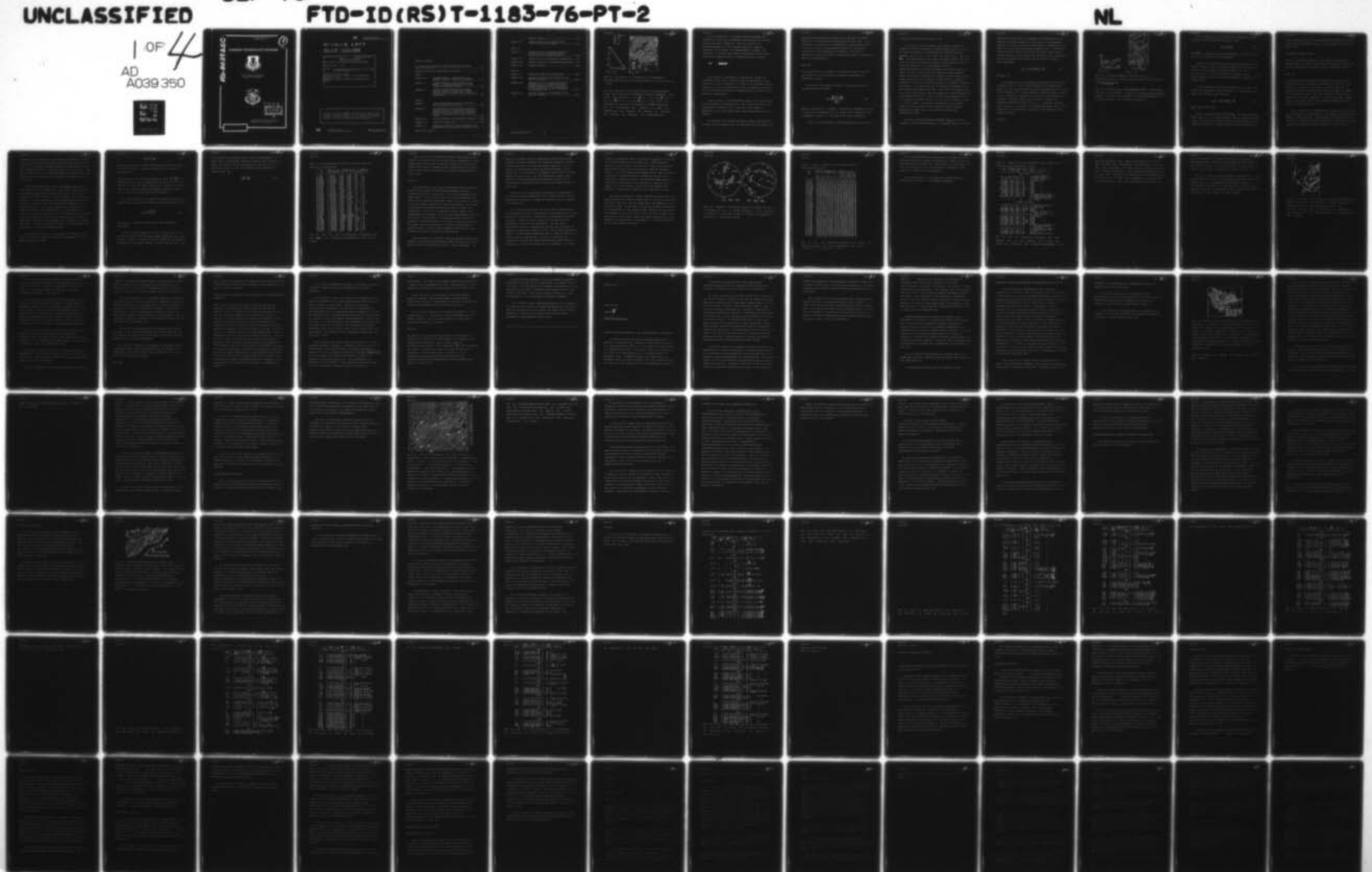

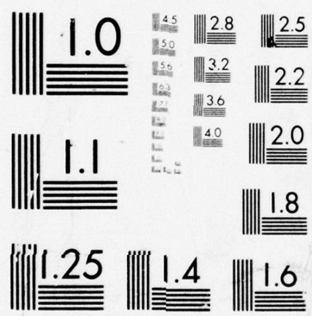
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PART 2 OF 2

FOREIGN TECHNOLOGY DIVISION

AIR FORCE SYSTEMS COMMAND

THE TASHKENT EARTHQUAKE
(SELECTED CHAPTERS)

FOREIGN TECHNOLOGY DIVISION

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FTD ID(RS)T-1183-76 Date 27 Sept 1976

TABLE OF CONTENTS

K	T (year)
14	100
13	38
12, 11, 10	16
9	6,5
8	6

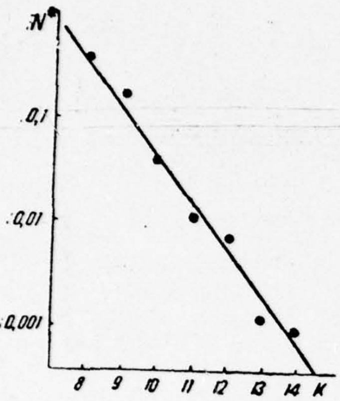

Fig. 196.

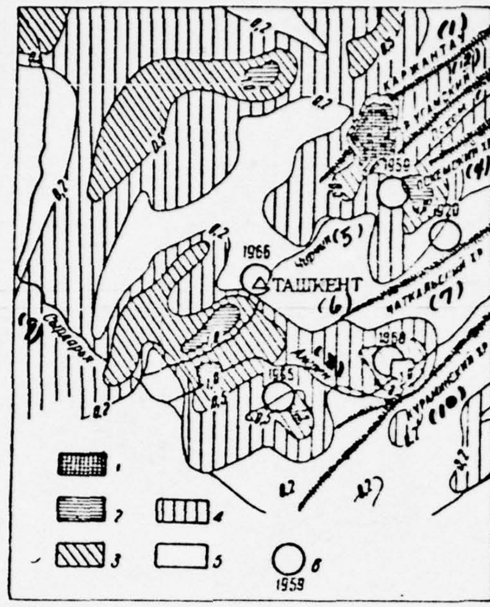

Fig. 197.

Fig. 196. Curve/graph of the frequency of the earthquakes of Pritashkentskogo region for the years 1868-1966 (γ = 0.46 ± 0.04, A_{10} = 0.04).

Fig. 197. Map/chart of the seismic activity of Pritashkentskogo region (1950-1966) and the epicenters of powerful earthquakes. Values of the seismic activity: 1 - A_{10} ≥ ~~:ml~~ 2; 2 - 2.0 > A_{10} ≥ ~~:ml~~ 1.0; 3 - 1.0 > A_{10} ≥ ~~:ml~~ 0.5; 4 - 0.5 > A_{10} ≥ ~~:ml~~ 0.2; 5 - A_{10} < 0.2; 6 - the epicenters and the year of the emergence of powerful earthquakes. Key: (1). To Karzhantlu. (2). Bugamskiy. (3). Pskem. (4). Pskemskiy khr. (5). Chirchik. (6). Tashkent. (7). illegible. (8). illegible. (9). Syrdar'ya. (10). Kuraminskiy khr.

For the calculation of the average lasting frequency, were considered the only those earthquakes, which provided the so-called normal background of seismicity. This was reached by the exception/elimination of the iterative impulses of powerful earthquakes and by account only representative on energy. The curve/graph of frequency (Fig. 196) is constructed for 8-14 energy classes of earthquakes during the following periods of vremei:

[redacted] [redacted]

Slope tangent of curve/graph $\gamma = 0.46 \pm 0.04$. During the comparison of this value γ with that which was found for an entire territory of eastern uzbekistan $\gamma = 0.5 \pm 0.05$ it is evident that the difference of the slope/inclinations of the curve/graph of frequency for the territories in question is unessential and is located of the accuracy of calculations.

Seismic activity of Pritashkentskogo region. On the curve/graph of the frequency of earthquakes (Fig. 196) is found the value of the average lasting activity - $A_{10} = 0.04$, that is the number of earthquakes of the tenth energy class, which proceed in year on area 1000 km^2.

The map/chart of the seismic activity of eastern uzbekistan with the large zone of averaging (see Fig. 189) gives only the general idea

about activity distribution according to the territory of region; therefore is constructed more detailed map/chart (Fig. 197). For its calculation are accepted into consideration of yemletryaseniya with K = 8-12, the periods of impressiveness of which are shown during calculations of the curve/graph of frequency. As the zone of averaging, is taken the area/site of rectangular form of approximately 250 km² in size/dimension.

Page 395.

The step/pitch of the calculation of activity was about 5 km, which was dictated by the mean error in coordinate determinations of epicenters in region.

The value of the seismic activity A_{10} for each mesh point was calculated from the formula:

$$A_{10} = \frac{\sum_{K=8}^{12} N_K^{12} \cdot C_K^{10} \cdot \frac{1000}{T_K \cdot S}}{\sum_{K=8}^{12} \cdot N_K} \qquad (12)$$

where A_{10} activity on K = 10; N_K - the number of epicenters of class K in the zone of averaging, T_K the period of the observation of the earthquakes of class K; S is an area of the zone of averaging.

C_K^{10} is a scaling factor of the activity, found on any class K,

to activity in the class of energy K = 10.

The isolines of seismic activity (Fig. 197) are carried out through the following intervals of values A_{10}: 0.2; 0.5; 1.0; 2.0; in accordance with which are distinguished the following zones of activity: $A_{10} < 0.2$; $0.2 < A_{10} < 0.5$; $0.5 < A_{10} < 1.0$; $1 < A_{10} < 2$; $A \geqslant 2$. The configuration of the zones of seismic activity (Fig. 197) is is very complex; attention is drawn to their elongation mainly in south-west direction, i.e., in accordance with the common/general/total structural plan/layout for Alpine tectonics in region. As noted above, the seismic activity A_{10} was calculated taking into account earthquakes only relative to small classes of the seismic energy K = 8-12. Therefore it makes sense to compare the distribution of zones A_{10} with the epicenters of powerful earthquakes. An increase in the seismic activity is correlated sufficiently well with powerful earthquakes (Fig. 197). Almost all the increased values $A_{10} > 1$ are arrange/located near the epicenters of such earthquakes as Brichmullinskoye (1959, K = 14-15, 7 balls), Koshtepinskoye (1965, K = 13, 7 balls), earthquake 1920 (K = 15, 7-8 balls) and Tashkent (1966, K = 13-14, 8 balls). The analogous suitability of the increased values of seismic activity to the epicentral zones of powerful earthquakes is noted also in other regions of Central Asia (Riznichenko, 1960).

The value of maximum possible earthquake K_{max} is the third parameter of seismic mode/conditions. On map/chart K_{max} for eastern

uzbekistan (see Fig. 190) it is possible to establish/install the value of the maximum earthquake at each point of the investigated territory. But this map/chart, as shown above, is constructed on the basis of the correlation dependence, obtained by Yu. V. Riznichenko (1966a) for other territories, between the values of the average seismic activity A, which characterize the zones of the preparation of the observed powerful earthquakes, and the classes of energy these earthquakes:

$$\lg \bar{A} = -1{,}16 + 0{,}21\,(K_{max} - K_{a}). \quad (13)$$

where $K_{\alpha} = 15$.

For obtaining Yu. V. Riznichenko's, dependence (13) it utilized earthquakes with K = 13-17. Under conditions of Pritashkentskogo region and entire eastern uzbekistan, the size/dimensions of the zones of the averaging of the seismic akgivnosti determining K_{max} proved to be so big that are connected the areas with different geological structure. Therefore sdegana are the attempt to obtain its correlation dependence between $\bar{A}$ and $_{max}$ (Zakharov, Seyduzova, 1969). For this, is increased the range isvol'zuyemykh K_{max} and are decreased the size/dimensions of the zone of the averaging of the seismic activity A.

Page 396.

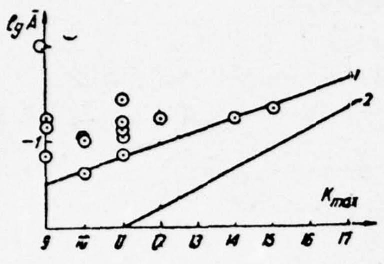

Fig. 198.

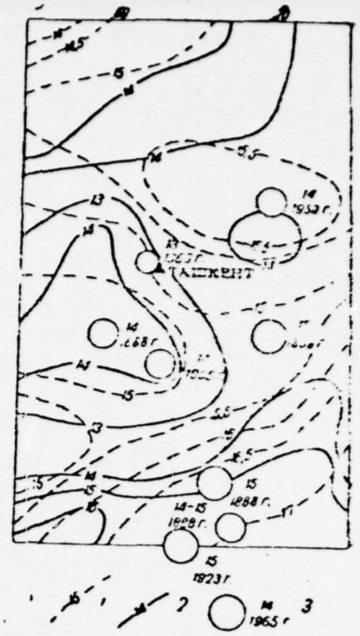

Fig. 199.

Fig. 198. Correlation dependence between A and K_{max} in Pritashkentskom region. Straight lines correspond to the equations: $1 - \lg \overline{A} = -1.08 + 0.13\ (K_{max} - 12)$; $2 - \lg \overline{A} = -1.79 + 0.21\ (K_{max} - 12)$.

Fig. 199. Map/chart K_{max} Pritashkentskogo region. Isolines K_{max} correspond to the formulas: $1 - E_{max} = ct^{a}$: $\lg \overline{A} = -1.79 + 0.21\ (K_{max} = 12)$: $2 - \lg - M + 6.5$; $\lg \overline{A} = -1.08 + 0.13\ (K_{max} = 12)$; 3 correspond the epicenters of powerful earthquakes (14 - the class of energy, 1965 - the year of emergence).

For the selection of the new zone of the averaging of seismic activity, is used dependence (Utsu, Seki, 1954):

$$\lg S = M + 6{,}0, \qquad (13a)$$

where M are a magnituda of powerful earthquake; S - the area of the zone of the epicenters of its aftershocks.

Further S was identified with the horizontal projection of the volume of seismic center on the earth's surface and was accepted as the zone of the averaging of seismic activity. For all M, corresponding K = 10-17, are calculated the values of area S. In this case, transition from one M to next was realized on dependence T. G. Rautian (1960).

In Pritashkentskom region during calculations, are taken into account the earthquakes of energy classes 9-15. The obtained thus correlation dependence takes the form:

$$\lg \bar{A} = -1{,}08 + 0{,}13\,(K_{max} - K_o). \qquad (14)$$

where $K_o = 12$ (Fig. 198).

During the analysis of map/charts K_{max} for a Pritashkentskogo region (Fig. 199) it is evident that the value of powerful earthquakes (K_{max}) much better is compared with the calculated values, which correspond dependence for Pritashkentskogo region (14), rather than

(13). According to data of the average lasting seismicity in region, are possible the earthquakes with K = 15, and directly near Tashkent - with K = 14.

MECHANISM OF SEISMIC CENTERS.

During the contemporary methods of the study of the mechanism of seismic centers (Is Report, 1956, 1960) is necessary as possible more points the environment of epicenter with the recording stations.

Page 397.

In connection with this before discovery/opening in the region of highly sensitive expeditionary grid/network (to 1960) here it was possible to determine the mechanism of origin/hearths only for relatively powerful earthquakes with magnitudoy M ~~=ml~~ ≥ 4 or K ~~=ml~~ ≥ 11. In the subsequent period - 1961-1967, appeared the possibility of research on the dynamic parameters of seismic centers with K ~~=ml~~ ≥ 10, while in the special cases of the successful location of stations relative to epicenters with K = 9.

At the present time is determined the mechanism of origin/hearths for 45 earthquakes of region with K = 9-14 (Zakharov, 1966; Zakharov, Matasova, 1968) (Table 25). Investigations are carried out with the aid of A. V. Vvedenskoy's method (1956, 1960). The signs of the first arrivals of longitudinal waves are removed in essence from the

seismograms of the stations of the stationary grid/network of Central Asia and expeditionary grid/networks of the institute of physics of earth by the AS USSR, the Tadzhik institute of sysmostoykogo building and seismology, institute of seismology the A.S. of the Uzb.SSR. Only for the small part of the considerably moved away stations these signs are taken from the bulletins of the institute of physics of earth by the AS USSR.

All the constructions are made in stereographic projection on Wulf's grid, where the displacement at each seismic station is related to conditional point with coordinates Az and α_h. Here Az is an azimuth of direction epicenter - seismic station; α_h - the angle of departure of seismic ray/beam from the origin/hearth, arrange/located at depth h. Azimuths Az are found graphically, whereupon for large epicentral distances were utilized constructions on Wulf's grid. Angles of departure from origin/hearth α_h are calculated as follows. In accordance with the model of the structure of the earth's crust the region's first arrivals of longitudinal waves depending on hypocentral distance can be represented by the arrivals of the waves, refracted in the layers of the earth's crust, or the leading wave from the roofing of the layer of Mekhorovichicha.

For determining angle α_h in the case of the refracted waves, first was located the speed on the depth of origin/hearth h through formula (Gamburtsev, 1959);

$$V_h = V_1 (1 + \beta h), \qquad (15)$$

where V_1 is velocity of elastic waves upon the inlet into I layer of the earth's crust; β - the lapse of velocity; h is a depth of origin/hearth.

Then according to the law of the relation of sines $\frac{V_h}{V_1} = \frac{\sin \alpha_h}{\sin \alpha_1}$ were calculated angles α_h, corresponding to the series of the preset angles of the inlet of seismic ray/beam into 1 layer of the earth's crust α_1 with different epicentral distances, sufficient close to those on which were located the recording stations.

For leading waves from the roofing of Mohorovicic's, layer the angle was calculated from the following formula (Gamburtsev, 1959):

$$\alpha_h = \arcsin \frac{\sin \frac{\Pi}{2} \cdot V_h}{V_M}, \qquad (16)$$

where V_{max} is velocity of elastic waves into Mohorovicic's krovlesloya.

At the epicentral distances of order 1500 km and more in the first arrivals were fixed the waves, passing through the upper layer of shell. Angles of departure for them no longer tale by constants, but depended on epicentral distances. In this case for angles α_h,

were located the approximate values. First on curve/graphs S. D. Kogan (1955) for determining epicentral distances were determined the angles of departure from the origin/hearth of α_{33} with depth 33 km which then according to the law of Sneliusa were recounted into unknown angles α_h:

$$\frac{\sin \alpha_h}{\sin \alpha_{33}} = \frac{6,8}{7,8}. \qquad (17).$$

Page 398.

Table 25. The earthquakes of region for which is studied the mechanism of origin/hearth.

(1) Дата	(2) Время возникновения землетрясения (час., мин., сек.,)	(3) Координаты очага			(4) Класс энергии, K
		φ	λ	h, км	
4. X 1956	00,58,22	41°08	69°09	15	11
7. VI 1959	01,19,19	40°56,7	70°03	15	11
24. X 1959	23,40,36,7	41°38	70°03	15	14
25. X 1959	04,35,45,3	41°41	70°06	5	12
26. XI 1959	20,13,35,5	41°42	70°03	15	10
27. XII 1959	21,51,10,3	41°42	70°03	15	10
31. XII 1959	09,50,59	41°36	69°45	15	10
18. XII 1960	22,42,53,2	41°40	70°07	12,5	11
14. III 1961	22,04,53	41°44	69°40	5	9
22. VII 1961	20,53,16	40°15	70°20	5	12
10. X 1961	07,34,15	40°54	69°03	15	11
21. XI 1961	05,00,06,5	40°31	70°14	20	12
6. I 1962	07,26,49	41°38,5	70°07	5	8
12. VI 1962	18,48,57	41°16,3	68°50,5	5	9
27. X 1962	00,01,56,7	41°10	69°06	15	10
8. XI 1962	17,51,09,5	41°41	69°35	5	9
27. XII 1962	04,53,17,8	41°37,5	70°04	15	10
16. I 1963	08,55,44	40°51,5	68°30,5	5	9
21. II 1963	21,35,43,3	40°56,5	68°35,5	5	10
30. XII 1963	07,00,23,4	41°32	69°53	5	10
22. III 1964	23,56,29	40°12	69°27	5	11
27. VI 1964	05,19,52,8	41°48	68°33,5	0–5	11
8. VIII 1964	19,17,56,7	40°51,5	68°22,5	5	8–9
10. X 1964	14,06,21,4	42°01	68°43,8	5	11
17. III 1965	13,14,15,6	40°51	69°21	25	14
17. III 1965	13,54,13,0	40°49	69°27	5	9
17. III 1965	15,39,11,3	40°51	69°20	15	9
2. VI 1965	21,28,00	41°54	69°54	25	12
26. VII 1965	00,38,35,6	41°48	69°54	20–25	12
1. IX 1965	07,01,33,7	42°18	70°27	10	11
5. I 1966	11,21,06,6	40°12	69°00	5	10–11
25. IV 1966	23,22,50,0	41°21	69°16	8	13–14
7.V 1966	21,10,23,5	41°20,75	69°16,46	6	11
9.V 1966	18,45,20,8	41°20,68	69°16,63	7	12
9.V 1966	18,50,46,0	41°20,68	69°16,63	6–7	11
24. V 1966	07,49,49,8	41°19,7	69°17	3–4	10
4. VI 1966	21,11,47,6	41°19,8	69°16,7	2–3	10
29. VI 1966	09,00,32,5	41°19,5	69°17	2–3	10
4. VII 1966	14,22,16,0	41°20	69°16,8	2–3	11
22. IX 1966	14,58,04,5	41°06	68°36	5	11
28. IX 1966	21,44,26	40°09	69°46	5	10
13. III 1967	21,58,52,6	40°59	69°19	20	11
24. III 1967	07,04,18,0	41°18,7	69°16	3	10
19. VII 1967	19,08,57,0	42°13	69°41	0–5	10
18. V 1967	11,31,21,5	40°38	70°45	25	12
29. X 1967	22,11,46,0	42°14	69°44	15	11

Key: (1). Date. (2). Time of the emergence of earthquake (hour. min., sec.,). (3). Koordinity of origin/hearth. (4). Class of energy.

Here 6.8 and 7.8 are velocities of elastic waves (km/s) of the bottom of the earth's crust and in the roofing of Mohorovicic's layer respectively (in this case the lapse of velocity in II layer of the earth's crust, where is arranged seismic center, was not considered, since errors lie/rest at the limits of accuracy of constructions on Wulf's grid).

Page 399.

The distribution of the signs of displacement into longitudinal waves for the strongest of the studied earthquakes of region - Brichmullinskogo (24. X 1959) from K = 14 and Koshtepinskogo (17.III 1965) from K = 13 it is shown in Fig. 200. Such constructions are made for each earthquake, indicated in Table 25, that made it possible to find the dynamic parameters of their origin/hearths: the position of the possible discontinuity surfaces and axes of shifts, the orientation of the axes of the principal stresses, removed at the torque/moment of earthquake. Errors in these determinations depend on many factors: the location of the recording stations relative to epicenter, the heterogeneities of the medium in which are propagated the elastic waves, and the errors in coordinate determination of seismic centers. As shown earlier (Zakharov, 1966), for the region of investigations, these errors do not exceed 15-20°.

For earthquake 24. X 1959 (Fig. 200a) both possible discontinuity surfaces in origin/hearth abrupt/steep, almost vertical, one of them almost meridional strike/course, another - almost latitudinal. The

axes of the possible shifts in origin/hearth will lie very gently; therefore in shifts predominate the horizontal components, presented by almost pure shear with small vzbrosovymi components. So, if we examine the discontinuity surface, oriented northwards, then the western edge of discontinuity is displaced or nay to north and upward relative to eastern edge. Over the discontinuity surface, which stretches in east-south-eastern direction, the northern edge of discontinuity is displaced almost to the east and upward relative to south edge.

The axes of principal stresses (compression i of elongation K) are almost horizontal, intermediate axle x almost vertical. Axis of contraction is oriented in northwestern direction, axis of dilatation - in northeastern.

For a seismic center 17.III 1965 (Fig. 200b) is characteristic the approximately identical orientation of both possible discontinuity surfaces in origin/hearth - southeasterly strike/course and inclined occurrence. Shifts over these surfaces are represented by the combination of upthrusts and shift/shears. So, over flatter discontinuity surface in origin/hearth northern edge is lowered and displaced to south west relative to south. Over another discontinuity surface in origin/hearth, northeastern edge is raised and displaced to south relative to southeasterly. The axes of contraction and elongation are oriented in northeastern direction, whereupon axis of contraction i is almost horizontal, axis of dilatation K - is almost

vertical. Intermediate axle x is oriented in northwestern direction, its slope/inclination very flat (Table 26). Az and e are measured according to Wulf's grid, in this case Az - angle in the horizontal plane between meridian and intersection of nodal and horizontal planes; e - the angle between two ukazarymi planes. The orientation of the axes of principal stresses is shown with the aid of two coordinates - azimuth Az (angle in the horizontal plane between the meridian and the direction in the exit point of axis) and angle i (angle in the vertical plane, carried out in this azimuth from direction in zenith before direction in the exit point of axis).

The dynamic parameters of seismic centers, arrange/located in the eastern, mountain and western, plains parts of the region, differ from each other (Table 26). This is evident during the comparison of Fig. 22, 200b and 200a. On the first two (Fig. 22 and 200b) the mechanisms of origin/hearths are very similar between themselves and are related to earthquakes 26. Apr. 1966 even 17. Mar. 1965 which occurred in the western part of the region. Figure 200a depicts another type of the mechanism of origin/hearth for earthquake 24. X 1959 of that occurred in the eastern part of the region.

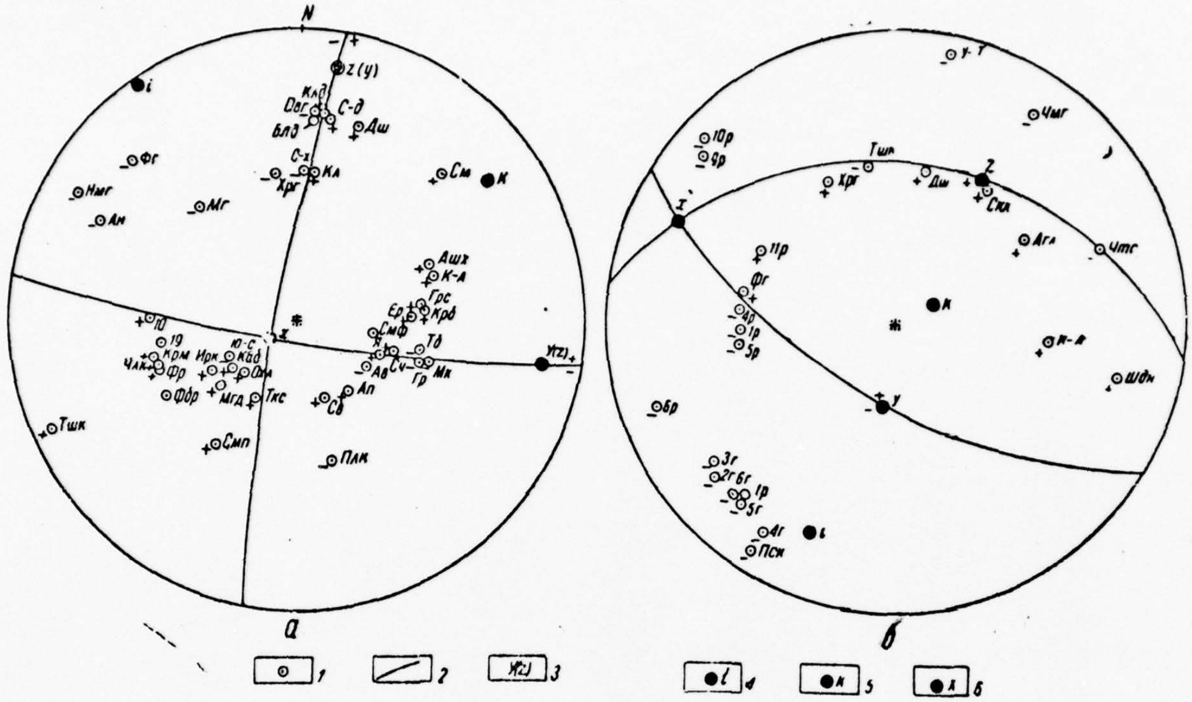

Fig. 2CC. Mechanism of the seismic centers cn 24 October 1959 (a) and cr 17 March, 1965, (b). 1 - seismic staticns; 2 - tc the vclczhente cf ncdal lines. Orientation cf axes; 3 - shifts; 4 - compressicn; 5 - elcngaticn; 6 - intermediate stress.

Page 401.

Table 26. Dynamic parameters of the seismic centers of Pritashkentskogo region.

(1) Дата	(2) Поверхности разрыва				(3) Подвижки				(4) Главные напряжения					
	I		II		I		II		ось сжатия (5)		ось растяжения (6)		промежуточная ось (7)	
	Az	e	Az	e	Az	e	Az	e	Az	i	Az	i	Az	i
4. X 1956	175	40	160	50	70	50	80	50	40	170	75	75	165	95
7. VI 1959	95	45	15	80	105	10	5	45	65	130	140	70	25	45
24. X 1959	10	80	100	80	10	10	100	10	145	270	55	75	55	170
25. X 1959	170	80	75	60	165	30	80	10	120	75	40	120	10	30
26. XI 1959	10	90	100	60	10	30	100	0	140	110	60	70	10	150
27. XII 1959	10	90	100	60	10	30	100	0	140	110	60	70	10	150
31. XII 1959	35	40	120	90	30	0	125	50	180	55	65	60	120	130
18. XII 1960	170	50	75	80	165	5	75	40	130	110	30	120	70	40
14. III 1961	35	55	120	80	30	10	125	35	170	70	70	60	110	145
22. VII 1961	180	40	165	50	70	40	90	50	80	85	145	170	170	80
10. X 1961	110	5	100	85	20	5	25	85	20	55	20	140	100	90
21. XI 1961	60	60	70	30	165	60	150	30	155	75	130	165	60	85
6. I 1962	40	60	155	50	65	40	130	30	45	45	100	60	10	125
12. VI 1962	125	30	85	60	175	30	35	60	10	110	145	155	90	75
27. X 1962	105	40	120	50	30	40	15	50	20	95	70	10	115	95
8. XI 1962	35	55	120	80	30	10	125	35	170	70	70	60	110	145
27. XII 1962	35	50	120	85	40	10	120	40	180	60	70	65	135	140
16. I 1963	75	30	95	60	5	25	170	65	180	70	25	20	90	100
21. II 1963	115	60	90	30	180	60	25	30	15	75	55	160	110	80
30. XII 1963	165	30	135	60	45	30	75	60	10	20	60	105	145	75
22. III 1964	15	65	110	75	20	15	105	25	160	120	65	100	140	30
8. VIII 1964	95	50	170	70	80	20	5	35	50	80	130	130	150	45
27. VI 1964	120	25	110	65	20	25	30	65	20	110	100	20	110	85
10. X 1964	90	25	125	65	35	25	175	65	20	115	60	30	120	105
17. III 1965	100	30	120	60	30	30	10	60	20	105	60	20	115	100
17. III 1965	95	35	90	55	5	35	0	55	10	10	5	100	95	90
17. III 1965	80	50	90	40	175	50	170	40	175	85	150	175	85	85
2. VI 1965	15	70	105	90	15	5	105	20	150	75	60	75	100	160
26. VII 1965	55	70	65	20	155	70	145	20	150	65	140	155	60	85
1. IX 1965	160	75	95	30	5	55	70	15	100	140	45	65	150	65
5. I 1966	45	35	50	55	140	35	135	55	140	100	165	10	50	85
25. IV 1966	130	20	125	70	30	20	40	70	35	115	30	25	125	85
7. V 1966	110	20	120	70	30	20	20	70	25	115	35	25	120	90
9. V 1966	135	20	120	70	30	20	50	70	35	115	20	25	125	95
9. V 1966	110	20	125	70	30	20	20	70	30	115	40	25	120	95
24. V 1966	110	20	120	70	30	20	20	70	30	110	40	25	120	95
4. VI 1966	110	25	135	65	45	25	20	65	35	110	60	25	130	95
29. VI 1966	110	25	130	65	40	25	25	65	35	110	50	20	130	95
4. VII 1966	110	25	125	65	50	25	20	65	30	110	45	20	120	95
22. IX 1966	140	20	150	70	60	20	55	70	65	155	55	65	145	85
28. IX 1966	10	50	25	40	120	55	100	35	70	175	110	80	20	85
13. III 1967	50	60	55	30	145	60	130	30	135	70	115	160	50	90
24. III 1967	55	5	55	85	145	5	145	85	145	140	145	50	55	90
19. VII 1967	140	30	145	60	55	30	50	60	55	105	65	15	145	95
18. V 1967	5	80	100	75	5	15	95	10	140	110	50	85	150	20
29. X 1967	30	70	35	20	125	70	120	20	125	65	120	155	30	90

Key: (1). Date. (2). Discontinuity surfaces. (3). Shifts. (4). Principal stresses. (5). axis of contraction. (6). axis of dilatation. (7) intermediate axle.

In the origin/hearths of the eastern part of region, one of the possible discontinuity surfaces is oriented, as a rule, in direction the north-north-east (Table 26). Slope angles for it vary from 30 to 90°. The orientation of the second surface is irregular. Slope angles for it change in the same interval.

In the western part of the region, both possible planes of discontinuity are oriented in northwestern direction.

Page 402.

Table 27. Powerful (M :ml 4) earthquakes, which occurred in the kizil-kums and Pritashkentskom region.

(1) Дата	(2) Координаты эпицентра (3) φ с. ш.	(4) λ в. д.	(5) Магнитуда	(6) К энерг. класс	(7) Источник
			(8) Кызылкумы		
					Устное сообщение (9)
1880	42,0–43,0	65,0–67,0	6	15,0	Данные условны (10)
3. VI 1929	43,1	66,7	$6\frac{1}{2}$	16,0	Атлас землетрясений в (11) СССР. М., 1962
4. VI 1929	43,0	66,5	$5\frac{1}{2}$	14,0	То же (12)
5. VI 1929	43,0	66,5	$5\frac{1}{2}$	14,0	.
13. VI 1929	43,0	66,2	5,0	13,0	.
4. IX 1929	43,5	67,0	$5\frac{1}{2}$	14,0	.
2. X 1932	41,4	65,6	$5\frac{3}{4}$	14,0	.
11. IV 1939	42,9	67,1	$4\frac{1}{2}$	12,0	.
18. I 1947	42,8	67,3	$4\frac{1}{4}$–5,0	12,0	.
23. XI 1953	42,3	64,4	$4\frac{3}{4}$	12,5	.
6. VIII 1955	42,0	65,0	$4\frac{1}{2}$	12,0	.
1. III 1958	42,6	65,0	4,0	11,0	.
19. VII 1959	42,6	67,4	4,0	11,0	.
1. II 1966	42,0	66,0	$4\frac{1}{2}$	12,0	Землетрясения в СССР, (13) 1966 г. М., «Наука», 1968.
13. [illegible]I 1968	42,5	66,9	$5\frac{1}{2}$		
14. III 1968	42,5	66,4	$5\frac{1}{2}$	14,0	Землетрясения в СССР, (14) 1968 г. М., «Наука» (в печати)
			(15) Приташкентский район		
4. II 1868	41,2	69,3	$5\frac{1}{2}$–6,0	14–15	Сейсмичность Узбекистана, (16) вып. II., 1964.
4. IV 1868	40,1	70,0	$5\frac{1}{4}$–$6\frac{1}{4}$	14	То же (12)
29. XI 1886	41,0	69,0	$5\frac{1}{4}$–$6\frac{1}{4}$	14,0	.
20. XI 1888	40,3	69,7	$6\frac{1}{2}$–$7\frac{1}{4}$	16,0	.
28. XII 1923	40,0	69,5	6,0	15,0	Атлас землетрясений в (11) СССР, М., 1962
7. VI 1924	41,3	69,2	$4\frac{1}{2}$–5,0	12–13	Атлас землетрясений в (11) СССР, М.,
16. X 1929	41,2	68,6	$4\frac{1}{2}$	12,0	То же (12)
12. X 1930	40,2	69,3	5,0	13,0	.
19. VI 1934	41,8	70,4	$4\frac{1}{4}$	12–13	.
28. VIII 1936	40,0	70,3	$4\frac{1}{4}$–5,0	12–13	.
10. VII 1938	41,3	69,3	$4\frac{1}{2}$–5,0	12–13	.
3. XI 1948	42,6	70,6	$4\frac{1}{4}$–5,0	12–13	.
14. III 1953	42,7	69,9	$4\frac{1}{2}$	12,0	.
24. X 1959	41,7	70,1	$5\frac{1}{2}$	14,0	Бюллетень сети сейсмических станций СССР, № 4, М., 1960 (17)
17. III 1965	40,8	69,5	$5\frac{1}{2}$	14,0	Землетрясения в СССР, (18) 1965 г., М., «Наука», 1967
2. VI 1965	41,9	69,9	$4\frac{1}{4}$	12,0	То же (12)
26. VII 1965	41,8	69,9	$4\frac{1}{2}$	12,0	.
25. IV 1966	41,3	69,3	$5\frac{1}{4}$	13–14	ДАН СССР, т. 177, 1967, № 3 (19)

Key: (1). Date. (2). Coordinates of epicenter. (3). north latitude. (4). V. d. (5). Magnituda. (6). E. class. (7). Source. (8). Kizil-kums. (9). Oral report/communication. (10).

Data are conditional. (11). Atlas of earthquakes in the USSR, m. (12). The same. (13). Earthquakes in the USSR, 1966 M., "science", 1968. (14). Earthquakes in the USSR, 1968 M., "science" (in press). (15). Pritashkentskiy region. (16). Seismicity of uzbekistan, iss. II, 1964. (17). Bulletin of the grid/network of the seismic stations of the USSR, No 4, M., 1960. (18). Earthquakes in the USSR, 1965, M., "science", 1967. (19). DAS of the USSR, Vol. 177, 1967, No 3.

In the distribution of the angles of the slope of the planes of discontinuity, also clearly are separate/liberated the intervals of the predominant angles. For one surface these are angles from 15 to 30°, i.e., it is almost horizontal; for another - from 45 to 75°.

Now let us examine the possible shifts in origin/hearths. In the eastern part of the region, we see irregular orientation of one of the possible shifts in origin/hearth with ill-defined expressed preobladannem slope angles to the horizon from 0 to 30° and clearly oriented in direction west-north-west another possible shift with the predominance of slope angles in the same interval.

Page 403.

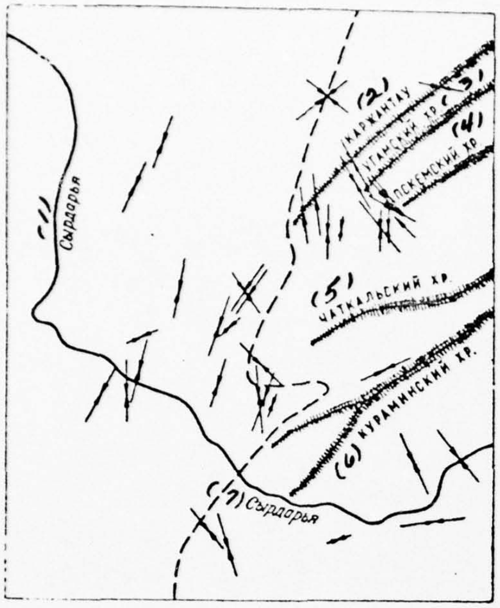

Fig. 201. The diagram of the compression stresses in Pritashkentskom region) arrow/pointer - the orientation of axes of contraction in seismic centers; its length corresponds to sine i = 1).

Key: (1). Syrdar'ya. (2). To Karzhantau. (3). Utamskiy khr. (4). pskemskiy khr. (5). Chatkal'skiy khr. (6). Kuraminskiy khr. (7). Syrdar'ya.

In the western part of the region, both possible shifts in essence are oriented in direction the north-north-east. For one of them, the range of the predominant slope angles to the horizon lie/rests in the interval from 5 to 30°, i.e., it is almost horizontal, for another - from 45 to 75°.

Let us examine the strike/course of axes of contraction in the vostochoy and western parts of the region. In western part the predominant number of axes of contraction has azimuth Az = 15-60°, i.e., they are oriented in essence in northeastern direction. In eastern part - Az = 135-165° axes of contraction are oriented in essence in northwestern direction. Angles of slope i of axes of contraction for mountain and plains parts lie/rest at interval of 60-90°, i.e., axes of contraction in region have flat occurrence.

For the axes of the tensile stresses both in mountain and in plains parts of the region predominates the orientation in northeastern direction, which separates less clearly than for axes of contraction. In the distribution of slope angles, it is not possible to isolate the range of the predominant angles.

Intermediate axles for both parts of the region are oriented disorderlyly. In eastern part the angles of the slope of these axes vary from 10 to 90°, in western - from 75 to 90°, i.e., intermediate axles here are almost horizontal.

During the comparison of the dynamic parameters of the seismic

centers of the western and eastern parts of the region, it is evident that the behavior of the cell/elements of seismic centers in the western part of the region is more regulated, and most is distinctly expressed the difference in the orientation of axes of contraction.

In the origin/hearths of the predominant number of earthquakes of the eastern part of the region (mountain) the compressive stresses act almost perpendicularly to the strike/course of surface structures and are oriented in essence in northwestern direction. In the western part (plains) of axis of contraction, are oriented in essence in northeastern direction. This difference in the orientation of axes of contraction, obviously, indicates the heterogeneity of stress field on the territory of region (Fig. 201).

If we on the given diagram conduct the boundary, which divides the ranges of the different orientation of axes of contraction, then it virtually will coincide with the boundary of orogen and platform, which knows how on tectonic map/charts.

As a result of research on the mechanism of the seismic centers of Pritashkentskogo region, are acquired data, that testify to the suitability of horizontal shifts to the orogenic part of the region and of vertical shifts to platform.

Page 404.

This confirms the assumption of the geologists about the proceeding at present tectonic process of the involvement of the western part of the region in orogenic activity.

SPECIAL FEATURE/PECULIARITIES OF THE SEISMICITY OF REGION AND TASHKENT EARTHQUAKE.

After Tashkent earthquake on 26 April 1966 the geologists and geophysics, repeatedly voiced opinion about the fact that the emergence of the origin/hearth of this powerful earthquake near the town is a phenomenon uncommon for a region and not expected. According to seismic division into districts 1962 (Medvedev. 1968), region g. of Tashkent is related to the 8-scale-number zone of seismicity, i.e., in any point/item of zone, including in Tashkent, possibly the emergence of jolts by the force of 8 balls. To cause the jolts of the determined force can and close weak and more powerful earthquakes, but moved away up to znachite'nye distances. in our case of jolt to 8 balls in region they can be caused by the powerful earthquakes whose sources are arrange/located in more seysmichnykh than Pritashkentskiy region, zones (such, as Chatkal'skiy spine/ridge or Ferganskaya depression). Therefore it is necessary to investigate the special feature/peculiarities of the seismicity of saogo region, also, on the basis of their comparison with data of research on the origin/hearth of Tashkent earthquake to make the conclusion: usual this phenomenon for the seismic life of region or completely not expected.

Let us examine manifestation strength of earthquake on surface as function of energy and depth of origin/hearth and its dynamic parameters.

We do not avail by data on the depth of the gipotsentrov of the powerful earthquakes, which occurred comparatively long; therefore we will be turned to nedanim events. Already in the period of instrumenta'nykh observations into the region of the poizoshli of Brichmullinskoye (to = 14) and Koshtepinskoye earthquake (to = 13-14). The epicentral zone of Brichmullinskogo earthquake was arrange/located at a distance 80-90 km of Tashkert, and Koshtepinskogo - 35-45 km (see Fig. 195). The origin/hearths of these earthquakes lay on depth 15-20 km, double larger than the depth of the origin/hearth of Tashkert earthquake (8 km); therefore their effect did not exceed 7 balls even by epicenter. In Tashkent both these earthquakes oshushchalis' with force only 5 balls.

Thus, earthquake with energy larger than Tashkent (to = 13-14), in region already they appeared. Furthermore, during the analysis of the map/chart of the possible maximum earthquakes, comprised for a region on the basis of research on weak focus seismicity ~~(8 :mg to :mg~~ (8 ≤ K ≤ 12) it is apparent that directly near Tashkent is possible the emergence of earthquakes with K = 14. The appreciableness of earthquakes on to poverkhnsti - their intensity, obviously, depends not only on the class of energy, but also on the depth of

origin/hearth. The depths of the seismic centers of region vary from 0 (almost surface earthquakes) to 30 km. Consequently, in no way is excluded the appearance of an origin/hearth on any of these depths.

During the study of the mechanism of the origin/hearth of Tashkent earthquake, established/installed that both possible discontinuity surfaces in origin/hearth are oriented in northwestern direction, their azimuths 125° and 130° (s./ Fig. 22).

one of them is inclined to the horizon at an angle of e = 70°, another flatter - e = 20°, shifts on these pverkhnostyam have the combined khaakter - these are sdvigo-upthrust over abrupt/steep surface and overthrust - on flatter.

Page 405.

The axes of the principal stresses, applied in origin/hearth to earthquake and removed at the torque/moment of its emergence, have selduyushchuyu orientation. Axis of contraction i the north-east-south-sapadnoo of the strike/course (Az = 35°) sufficiently of curtains - its angle with zenith i is equal to 115°; axis of dilatation k is abrupt/steep, angle i is equal to 25°, its strike/course almost meridional; intermediate axle x of north-west-south-eastern strike/course and almost goriznotal'naya, angle i is equal to 85°.

Thus, the dynamic parameters of the origin/hearth of Tashkent earthquake are typical for the origin/hearths of the western part of the region. Here both surfaces of the possible discontinuities in the origin/hearth of usually northwestern strike/course, shift on them - faults and upthrusts. Axes of the principal stresses of the same orientation, as in the origin/hearth of Tashkent earthquake.

After examining special feature/peculiarities of the seismicity of region and these research on Tashkent earthquake, it is possible to draw the conclusion that in the energy, the depth and from icheskim parameters of seismic center 26 aprel4 1966 is usual, series earthquake in Pritashkentskom seismic region.

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Chapter ~~II~~ IV

Seismotechtonics

~~SEYSMCTEKTONIKAENDTITLE.~~

SPECIAL FEATURE/PECULIARITIES OF THE SEYSMCTEKTONIKI OF UZBEKISTAN.

The Seysmctektcnicheskiye special feature/peculiarities of the territory of uzbekistan were touched upon in one form or the other in D. I. Mushketcva's works (1933), G. P. Fct (1949), V I Popova (1955), E. A. Petrushevskogo (1955) S. D. makarcv (1955), F. M. Chernishev et al. (1910), N. P. Vasilkcvskiy and M. P. Repnikcva (1940), R N. Ibragimcva and Kh. A. Atabaeva (1964), D. Kh. Yakubcva and R N. Ibragimcva (1967), and also in compound work on the seysmotektonike of the territory of the republic of the C.A. of Ryzhkova, etc. (1964).

In summation, of these and many other investigations established/installed that the earthquakes, which proceed in the territory of uzbekistan, must be related to the type tectonic.

As shown in chapter II of this part the fold-block structures of the orogen of northern and western Tien Shan are represented by large anticlinal uplift/rises and the synclinal downwarp/troughs, created during the Alpine (including newest) development stage of region. In the east of republic, predominate the structures of south-west and latitudinal strike/course, into west - northwestern and submeridional. The configuration of large structures almost everywhere is monitored by regional fractures. The basement structures of orogen during Alpine tectogenesis experience/tested stable uplift/rises, and the only individual sections of territory they underwent comparatively insignificant depressions. The uplift/rises of tale are broken by the series of fractures and experience/tested the differentiated block displacements, which especially clearly is observed, for example, in Chatkalo-Kuraminskoy and alai-Turkestan mountain systems.

In the plains parts of the territory at that time, occurred the rearrangement of structural plan/layout. In foothill parts initiated to be form/shaped oligocene-Quaternary period basin/depressions with similarly Tashkent-golodnostepskoi and Kashkadar'inskoy. Within their limits, and also in intermountain basin/depressions appear internal neotectonic structures. Majority of them serves as the continuation of the large anticlinal uplift/rises of orogen. In the territory of

Turanian plate/platform, the strike/course of neotectonic structures in essence coincides with the strike/course Hercynian, but in foothill basin/depressions ancient and newest directions frequently they are intersected.

Great significance in the tectonic structure of uzbekistan they have the revealed in neogen-Quaternary period time fractures. In essence these are the Hercynian scouring/erodings, revived in Alpine time. In the majority of cases, they are arrange/located in the zones of the articulation of uplift/rises and deflections, on which as a result of the newest differentiated motions separate mountain ranges are raised on high altitudes (to 4000-5000 m).

Page 407. Research on the location of the epicenters of earthquakes shows their common suitability to the ranges postplatformennogo orogen and to the zones of the transition of orogen with foothill basin/depressions. The remaining part of the territory differs in terms of less seismicity (powerful earthquakes virtually are absent). This distribution of the epicenters of earthquakes attests to the fact that the tectonic structures of orogen continue to intensely be developed at the present time, and contemporary motions here they bear the sharply pronounced differentiated character, which is evident also from geological data.

Seysmostaticheskiye data show that the majority of the earthquakes of uzbekistan is connected with shallow origin/hearths. If we do not consider the separate/individual origin/hearths, arrange/located at depth 35-40 km, remaining earthquakes can be connected with the visible on surface tectonic structures. So, in the south part of the Ferganskoy basin/depression the majority of epicenters is connected with southern-ferganskoi fold-disruptive zone or southern-ferganskim fracture. To them are timed the origin/hearths of Kostokozskogo earthquake 1888, Andizhanskogo 1902, Uratyubinskogo 1924, etc.

The same situation characterizes the south-west spurs of the Gissarskogo spine/ridge where are known Karatagskoye 1907, Baysunskoye 1935 earthquakes, etc.

To seysmogennym seam lines they are related also north-

ferganska4, Chatkalo-Atoynakskaya, Karzhantauskaya structure, etc.

The seismic activity seysmogennykh joints, judging by observations, is different. This not that means that those sections on which thus far are not noted powerful earthquakes, aseysmichny. If geological materials attest to the fact that the fracture is active in all its extent/elongation, then it entire must be considered as potential-earthquake-hazard which is indisputable, it will be confirmed with the sufficiently prolonged period of observations. as one of the external sign/criteria here serves break, if we bear in mind D. Tokor's conclusions (1952) on California earthquakes (precisely there it turned out that the longer the fracture, thereby it is more dangerous in seismic relation). In this connection it is important to note that many fractures of uzbekistan of regional character have large extent, reaching 300-400 km and more, and they must be considered in all its extent/elongation earthquake-hazard (for example the section of north-ferganskol fold-disruptive zone near Supetausskogo uplift/rise, which until recently was considered weakly seysmichnym). On the basis of geological conditions later this area is related to the zones of the increased seismic danger, that also was confirmed by the manifestation here of the '-"-scale-number earthquake on 18 May 1967 (Ibragimov, 1970).

At the same time are fractures which in seismic relation are safe, is safe Kumbel'skiy, Almalykskiy other fractures of northwestern strike/course in Kuraminskom spine/ridge. The basic criteria for the

separation of discontinuities into earthquake-hazard and less dangerous are their age and scale.

On the basis foregoing, it is possible in the first approximation, to isolate the determined areas where the totality of seysmotektonicheskikh factors indicates the relatively high seismicity, and the sections of weak seismic activity.

In the intensity of the manifestations of seismicity in its comparison with tectonic situation in the territory of uzbekistan it is possible to isolate four area (Fig. 202).

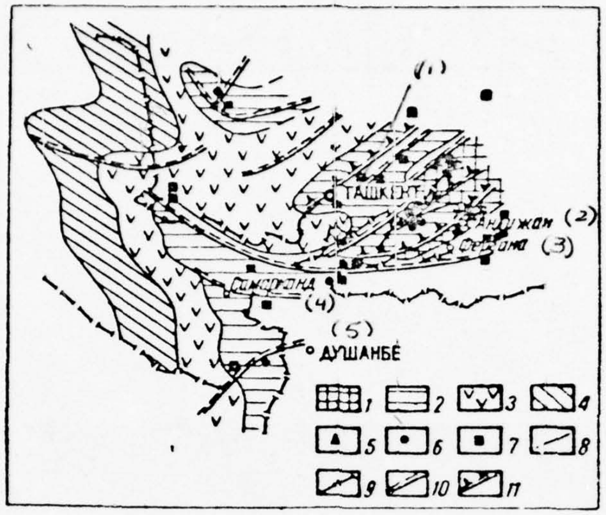

Fig. 202. Diagram of seismic danger according to geological data of uzbekistan. - the areas: 1 - the first category (M = 7.5; 7.5 it is above; 96 and more); 2 - the second category (M = 6.5, 6.5-7.5; 8-96.); 3 - the third category (M = 5 1/4, 5 1/4-6.5; 7-86); 4 - the fourth category (M = 4 1/4, 4 1/4-5 1/4; 6-76); 5 - the epicenters of 9-scale-number earthquakes; 6-8 - scale-number earthquakes; 7 - "- scale-number earthquakes; boundary; 8 - between the areas of different category; 9 - uzbekistan; 10 - regional fractures; 11 - fold-disruptive zones.

Key; (1). Tashkent. (2). ANDJAN. (3). Fergana. (4). Samarkand. (5). Dushanbe.

The area of the first category covers in essence the eastern part of the republic and includes the eastern parts of the Ferganskoy basin/depression and its mountain framing. The area is characterized by the stressed state of the earth's crust during entire time of Alpine tectogenesis, especially in neogen-Quaternary period time. Neotectonic dvizheniverkhnego oligocene, were revealed here with larger intensity, individual sections were enveloped by the local uplift/rises or depressions with shaping of the revived, young, frequently intersecting fractures. The vertical spread/scope of tectonic movements for oligocene-Quaternary period time reaches about 12-13 km, whereupon to the lot of verxneplicgen-Quaternary period motions it comes about 5-5.5 km. The contrast of these sections was preserved up to now. With this will agree the high seismicity of area. Here repeatedly appeared earthquakes with M = 6 1/2 with the epicenters, which were being well connected with the zones of the contrast motions along which occur the contemporary shifts of the earth's crust. Such sections of the earth's crust and in the future must be considered as areas seysmichnye.

In the diagram are isolated the determined seysmogennye zones where are possible powerful earthquakes up to 8-9 balls and more intensity. Such sections include the Chatkalo-Atoynakskaya zone of fractures, north-ferganska4 and southern-ferganska4 fold-disruptive zones and southern-ferganski1 fracture.

The area of the second category is arrange/located to west from the first and covers vaster territory. In eastern part it stretches

itself in south-west direction, while in region ç. of Dzhizaka it turns to northwest.

Page 409. Within the limits of this area, are known the earthquakes with M = 6 1/2 and 5 1/4. Here the positive tectonic structures of orogen, creating a series of virgatsiy, draw in into the range of rising the individual sections of oligocene-Quaternary period basin/depressions and adjoining them plains of Turanian plate/platform. Simultaneously revive ancient and appear young fractures, on which occur the differentiated shifts at present. During the continuation of uplift/rises to west, is noted an increase in the younger anticlinal folds, expressed on surface in the form of adyrnykh bands. The rate of tectonic motions here is relatively lower than on the area of the first category; however, powerful earthquakes appear fairly often. Within the limits of this territory, are isolated the earthquake-hazard zones where is possible earthquake by the force of 7-8 balls.

The area of the third category is arrange/located western than the second and covers the plains scopes of Tashkent-golodnostepskoi, Kashkadar'inskoy foothill basin/depressions, Turanian plate/platform and Kyzylkumskikh uplift/rises. This area in geological structure, the history of geological development and the character of the newest tectonic motions differs little from preceding/previous; however, here the rate and the intensity of contemporary tectonic motions still below. Within its limits are known the earthquakes with M = 5 1/4 and 4 1/4. Are here possible earthquakes siloyu to 6-7 balls.

The area of the fourth category covers the western part of the Kyzylkumskikh uplift/rises and the sections of Bukharo-Khivinskoy

depression. Tectonic motions here are exhibited with substantially less intensity and seismic activity is weak. It is possible to expect here earthquakes with magnitudoy to 4 1/4.

In one of the regions within the limits of areas the III-IV category recently is observed the intensification of contemporary motions along regional Tamdykulakskomu fracture. As a result on surface, appear the echelon-like arranged/located cracks, which stretch in the direction of discontinuity on several kilometers. Formation of cracks is not accompanied underground push, although the rate of contemporary motions in individual sections reaches 6-8 mm/year. However, on the intensification of tectonic motions within the limits of the kizil-kums it is possible to expect the pyavleniya of the perceptible and powerful earthquakes.

Thus, as a whole in the territory of uzbekistan from the east to west is observed the regular gradual weakening of intensity and differentiability of the newest and contemporary tectonic motions, with which is connected a decrease in the seismic activity in the same direction.

SEYSMOTEKTONICHESKIYe ZONES.

From the viewpoint, geologies, for a Pritashkentskogo region are characteristic the instability of tectonic mode/conditions, which is expressed in nepreryvnopreryvistom retraction into the orogen (range

postplatformennoy avtivizatsii) of the areas of the adjoining it parts of the Tashkent-golodnostepskol basin/depression for Alpine time, and the considerable intensity of the newest and contemporary tectonic motions and their pronounced differentiation.

Since there is sufficiently complete information about the earthquakes in Pritashkentskom region, which were being perceived for the latter 100 summers, it is possible to attempt to show communication/connection between the special feature/peculiarities of tectonic situation and earthquakes, seismic centers with the zones of large regional fractures and with finer local structures.

Page 410.

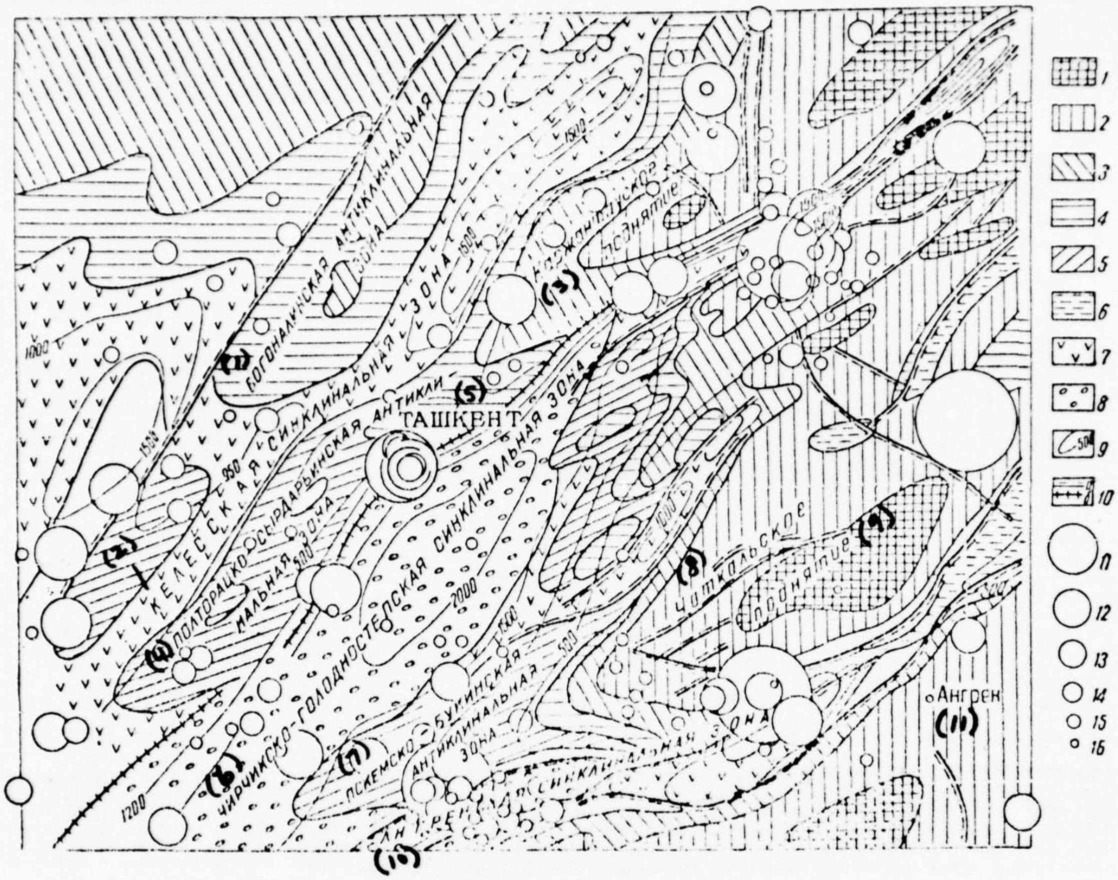

Fig. 203. Diagram of the comparison of the newest tectonics and localization of the epicenters of the earthquakes of Pritashkentskogo region. Sections: 1 - being intensely risen from mnotsena; 2 - from late pleiocene; 3 - from early pleistocene; 4 - from the average pleistocene; 5 - from late pleistocene; 6 - the pozdnepliotsenovykh deflections, implicated into uplift/rise in early aptropogene; 7 - ranne- and the middle- pleystotsenovykh deflections, implicated into uplift/rise in late pleistocene; 8 - contemporary deflections; 9 - the isopach of neogen-Quaternary period deposits; 10 - fractures; a) fracture dislocations; b) fold-disruptive zones; 11-16 - the epicenters of earthquakes.

Key: (1). BOGONALINSKAYa anticlinal zone. (2). KELESSKA4 synclinal zone. (3). Karzhantpuskcye uplift/rise. (4). One-and-a-half-syrdar6inska4 anticlinal zone. (5). Tashkent. (6). CIRCIKSKC-golcdncstepska4 synclinal zone. (7). ESKEMSKC-EUKINSKA4 anticlinal zone. (8). Chatkal'skcye. (9). uplift/rise. (10). ANTRENSXL4 synclinal zone. (11). Angren.

The analysis of the distributions of the epicenters of earthquakes shows that the sections of the increased seismic activity on the whole coincide with the sections of the high gradients of the newest tectonic motions, i.e., with the boundaries of the large structural cell/elements of the different signs of motions.

As shown earlier (chapter III), in Pritashkentskom region are separate/liberated several different in structure and history of the tectonic development of structures. Depending on character, scale and the age of the newest motions, here they are separate/liberated first of all Tashkent-golodnostepska4 oligocene-Quaternary period basin/depression and the megantiklinali of Western Tien Shan.

Tashkent-golodnostepska4 basin/depression in the process of the newest tectonic motions is dismembered to the sections of uplift/rises and deflections with their dividing or complicating fracture dislocations. Many of similar structures retain its mobility up to now, which is expressed not only in geological, but also in geomorphological plan/layout.

As a result of the analysis of the kinematics of such structures, is isolated a series of the zones of powerful and weak earthquakes. As the basic criterion for the liberation of these zones served such sign/criteria as presence of regional fractures, the time of their emergence, the sign/criteria of their rejuvenation, the presence of the sections of the contrast articulation of large structural complexes, rearrangement and superposition of tectonic structures,

character of the newest and contemporary motions, etc.

As the most important active seismo-tectonic zone in Pritashkentskom region serves the one-and-a-half-syrdar6inska4 anticlinal zone, which is arrange/located on continuation Ugam-Karzhantauskoy. Specifically, are here concentrated the epicenters of powerful earthquakes (Pskemskogo 1937, Brichmullinskogo 1959, Tawkentskogo 1966) and frequently are repeated weaker (Fig. 203). Is characteristic the very configuration of the isolines of activities, which create the linearly elongated bands, which coincide with the strike/course of tectonic zones. Similar pattern is observed in other seysmotektonicheskikh zones - Bogaralinskiy, Eskentsko-Bukinskoy, etc. The one-and-a-half-syrdar6inska4 seysmotektonicheskaya zone, unlike others, is characterized by the presence here regional fracture-pritawkentsko1 fold-disruptive zone, which is confirmed by data the geophysicists. During the analysis of the gravitational field, established/installed the presence of the clearly expressed bands of the anomalies which are interpreted by kA the series of the fractures, which stretch in northeastern direction. In the majority of cases, they are represented by overthrusts or upthrusts. Knowing the power/thicknesses of neogen-Quaternary period deposits in one-and-a-half-syrdar6insko1 seysmotektonicheskoy zone (400-500 m) and Chirchiksko-Golodnostepskom downwarp/trough (1800-2000 m), they determined the amplitude of displacement by this zone (by places to 1400-1500 m).

Nadvigi and upthrusts represent only the part of the tectonics of fold-disruptive zone, in actuality, it is constructed extremely complicatedly, with the abundance of the plicated disturbances in sedimentary cover, with complications in the form of the disruptive dislocations of the second order.

Page 412. The majority of the discovered to the present torque/moment finer structures are related to the elevated wing of Pritashkentskoy flexure. Recall that the seismic centers of this region also are arrange/located on the elevated wing.

In seismic relation active sections are the Pskentsko-Brichmullinskaya and Tashkent epicentral zones. Recently appear data, that testify to the activity of one additional zone - between Yangiyulem and by Chinazom. Apparently, here can arise powerful earthquakes.

The Pskemsko-Brichmullinskaya seysmotektonicheskaya zone is arrange/located on the continuation of the Chatkal'skoy, which is characterized by the brightest manifestations seismicity (catastrophical Chatkal'skoye Is zey9ya').

In Tashkent-golodnostepsko1 basin/depression as continuation Chatkal'skoy serves Pskentsko-Brichmullinskaya seysmotektonicheskaya zone. Within its limits is arrange/located the Tashkent epicentral zone, with which is connected many weak earthquakes. On the intensity of tectonic motions in this zone it is possible to judge by the clearly expressed and deformed terraces r of Angren. To this zone are timed the origin/hearths of Koshtepinskogo earthquake 1965 and the epicenters of its iterative impulses. They are arranged in the zone of the fractures, which separate/liberate Pskentsko-Bukinskuyu zone from Angrenskoy depression into west.

On northwest of one-and-a-half-syrdar6inskc1 zone, is separate/liberated one additional band of the relatively increased seismic zone it is separate/liberated one additional band relative to the increased seismic activity - the Bogcnalinskaya and Mansuratinskaya seysmotektonicheskiye zones, less active, than is syrdar6inska4 and Pskentskc-Bukirskaya. The information about powerful earthquakes here completely is absent, single earthquakes can be, apparently, related to class K = 12. A similar low seismicity is found in accordance with the special feature/peculiarities of geological history and contemporary tectonics of region.

During Mesozoic and Paleogen of Bogcnalinskaya and Mansuratinskaya zone was experience/tested slow deflection and tale with the arena of the steeling-accumulation of great Cretaceous and Paleogene thicknesses. Only at the end of the neogen and in the beginning of Quaternary period the sign of motions was replaced and the individual sections of these zones they initiated to experience/test rising, in connection with which here were defined the zones of uplift/rises, gradually increasing their area because of the previous deflections. Traffic volume and their differentiation did not reach that degree in order to cause the zdesl of the earthquake of large force.

One-and-a-half-syrdar6inska4 zone began to be form/shaped as positive structure earlier, even in the beginning of neogen (it can be, even in oligocene), and motions here several times it is more

irtense and contrast than in Bogonalinskcy zcne. The manifestaticn of the newest moticns caused the differentiated shifts with respect to the fractures which bordered deep riftopcdctnye valleys.

The indicated difference in the geclogical history of Mansuratinskoy and Boganalirskcy seysmctektcricheskikh zones from the cre-and-a-half-syrdar6inskc1 others causes the special feature/peculiarities of their seismic mode/conditicns.

SEYSMOTEKTONIChESKAYa SITUATION OF TASHKENT EPICENTRAL ZONE.

The increased seismicity g. cf Tashkent and its neighborhoods drew the attention of many researchers.

Page 413. Specifically, N. F. Vasilkovskiy and M. P. Repnikov (1940) consider that the epicenters of the powerful earthquakes on 4 February 1868, on 29 November 1837, that brought the large damage to city, were located in Tashkent. Thereby they allow/assumed the existence of Tashkent seismic origin/hearth G. V. Popov (1939) it indicates also the concentration of the epicenters of powerful earthquakes into 6 balls, but according to some sign/criteria above, in the region of Tashkent. On the basis of the analysis geological-geophysical dannnykh O. A. Ryzhkov, R. N. Ibragimov et al. (1961) arrived at the conclusion about the high tectonic activity of the Pritashkentskoy fold-disruptive zone, within limits of which is arrange/located with g. Tashkent, and allowed possibility the emergences here of earthquake by the force of 5-7 balls and more.

In territory the manifestations of Tashkent earthquake as showed the latest investigations, it is possible to find the sign/criteria of the young motions of the earth's crust. They were expressed first of all in the formation of the anticlinal folds which initiated to intensely be developed with the onset of orogenic motion. First folds appeared during the axes of the adjacent uplift/rises, and then also in quite Pritashkentskoy basin/depression. These folds, being arrange/located echelon-like, created the linearly elongated anticlinal zones of the northeastern strike/course, which gradually involved into the process of rising the area of the dividing them synclinal zones which narrowing (apparently, because of tangential compression) they acquired the form of narrow grabenopodobnykh valleys.

The process of fold formations continues at the present time, to which testifies the presence both expressed on the surface and the buried young folds within the limits of one-and-a-half-syrdar6insko1 anticlinal zone, which are accompanied by the formation/education of the deformed river terraces.

Within the limits of Tashkent, is revealed a series of the young folds which, according to V. Z. Zakharevich's data, are developed during continuation May anticlines and is drawn in the form of chain/networks in south-west direction. Largest of them is arrange/located in the northeastern part of the city. Its axis, being immersed to south west, forms the bend which is fused with Kelesskim downwarp/trough. After bend begins the lift and they appear echelon-like iwan-barrow-4ngihl6skie folds.

The paleozoic basement of city as a result of the newest motions is broken by Kelesskim, Karakamyshskim, Tashkent and Chirchikskim fractures. On the sections where occurs the sharp subsidence of the joints of folds or deep their undulyatsiya, apparently, are renewed ancient and are developed the young feathering disruptive dislocations.

The analysis of the newest and contemporary tectonic motions shows that the individual sections of territory are implicated into uplift/rise even in the average/mean Quaternary period; this process

continues and at present.

In structural ratio Tashkent and its neighborhood, they are arrange/located within the limits of the Pritashkentskoy fold-disruptive zone which borders on one-and-a-half-syrdar6inskc1 by anticlinal and Chirchikskc-Golodnostepskcy synclinal zones. These structures both in newest time and in contemporary stage experience/test the differentiated motions near Tashkent, to which testify jump/drops in the power/thicknesses of neogen-Quaternary period deposits on structures.

As showed the investigations, on an entire territory of Tashkent-golodnostepskc1 basin/depression, predominate the ascending motions and the section of local depressions ever more intense it is drawn in into the process of uplift/rise. The same picture is observed in Tashkent and its neighborhoods where finer folds and even Kelesskiy porgib experience/test at present tendency toward rising.

Page 414.

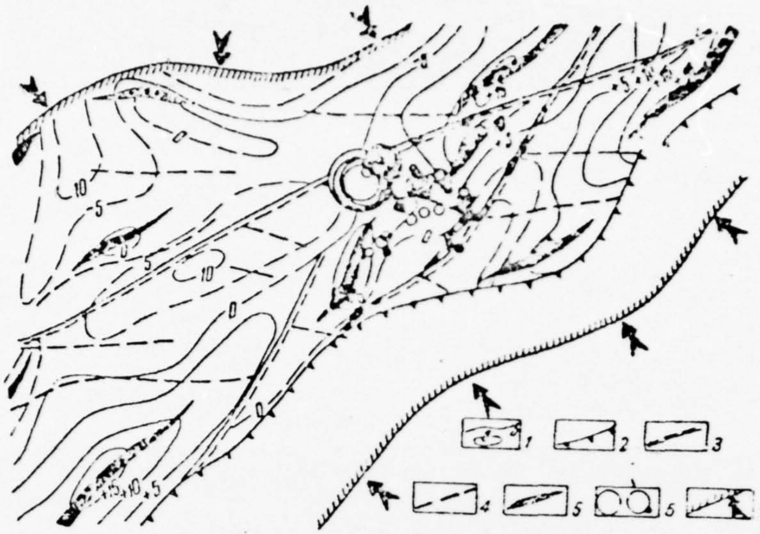

Fig. 204. Seysmotektonicheskaya diagram of Tashkent region. 1 - the line of the equal amplitudes of the relative strains of the primary surface illegible (Tashkent) is loess (v.m.); 2. the sections of the fold-disruptive zone where occurs the sharp subsidence of neogen-Quaternary period deposits; 3. piyeystotsenovye fractures (seysmogennye); 4 - the pozdnepleystotsenovye zones of fracture (discontinuities seysmogennye); 5 - the axis of golotsenovykh relative uplift/rises; 6 - the epicenters of Tashkent earthquake; 7 - the direction of tangential stresses.

The special feature/peculiarity of the deep structure of the earth's crust and its upper part, and also the character of the manifestation of contemporary tectonics and seismicity in the investigated region confirm the considerable role in the common/general/total development of the newest motions of forces of periphery. Tangential compression undergoes the basic longitudinal structure of the territory of city, expressed in the structure of basement the linear uplift/rise, limited by the fracture of northeastern strike/course. In contemporary relief to it corresponds the morfostruktura of the main Tashkent watershed, while in the structure of sedimentary cover, it corresponds Tashkent anticline.

The demonstrative concept about the character of the newest motions gives seysmotektonicheskaya diagram (Fig. 204). The general amplitude of the relative uplift/rise of axial part Tashkent the anticlines of the main Tashkent watershed above its ogranichivayushchimi local downwarp/troughs achieved for this time 30-35 m, and above the downwarp/troughs of Chirchikskoy depression, it achieved 50 m. The amplitude of the undulyatsii of the axis of fold varies within limits 5-15 m.

Established/installed by geodetic measurement the maximum displacement of the earth's surface are timed to the periklinali of the local echelon-like uplift/rise, which complicates Tashkent the anticline above the elevated wing of discontinuity. The epicenters of earthquake and majority of its iterative impulses are localized within the limits of the flat tectonic col, which separate/liberates this

uplift/rise from the adjacent, arranged/located 2.5-3 km more south-west.

The origin/hearth of Tashkent earthquake is arranged near the center of city at depth 8 km and is connected with shifts on the plane of noncritical fracture, which is located in the limits of Pritashkentskoy fold-disruptive zone.

Page 415. Displacement along smestitelya occurred upward, also, to south west on the spot of the undulyatsii of the axis of fold where the joint of Tashkent uplift/rise relative to raised itself almost on vertical overthrust. According to seismological data the plane of discontinuity falls at an angle of 65-70° to northeast and has northwestern strike/course (azimuth 220°). Fracture did not leave to surface, but in pleystoseystovoy range appeared in unconsolidated deposits the surface disturbances, their morphology testifying to the development both of the horizontal and vertical stresses of in time seismic jerk/impulse.

The geodetic measurements showed that occurred the change in the relief in the territory of city, which expressed in the form of dome-shaped uplift/rise, which coincided with the periklinal'yu of Tashkent fold. With this uplift/rise are connected also the surface cracks, which displace each other on the determined sections of relief, they retard the amplitude of displacements over cracks. However, judging by character majority of them it is the cracks of compression and elongation.

In Pritashkentskom region, especially in the eastern part for which examined stressed sostoyaniye of crust, epicentral part coincides, in the first place, with the range of developing the linearly elongated tectonic structures, in the second place, here they predominate nadvigi, upthrusts or vzbrosonadvigi. In the formation of these structures as it is bygone shown above, the leading role play tangential stresses. In anticlinal zones is observed the gradual

retraction of the periklinal'nykh parts of the folds into uplift/rises. The process of retraction occurs through undulyatsionnye or periklinal'nye downwarp/troughs which frequently coincide with the feathering discontinuities. The approach of the joints of fold on fracture is accompanied by the brittle breakdown of rocks and by the dropping of the elastic strains which, apparently, pass over to seismic energy, causing jolts on surface. This tectonic prerequisite/premise of the emergence of Tashkent earthquake is confirmed by seismological data (hr. I). Levelling elastic strains on tectonic structures requires the specific time, which, apparently, caused a large quantity of aftershocks.

In the structures of compression, as a rule, occurs the extrusion upwards and the rising of adfracture wedges, while in our case - the periklinal'noy part of the Tashkent fold. In structural ratio the uplift/rises of surfaces reflect the structure of anticlinal fold. Since the rising upwards occurred because of tangential forces, they occupy the completely determined place in shaping of relief and increase in the fold in epicentral zone.

Thus, Tashkent earthquake is caused by an increase in the anticlinal fold, which is the buried continuation of Karzhantauskogo uplift/rise, and it was accompanied by the displacement of rocks over the transverse fracture of northwestern strike/course in accordance with the overall stress field of horizontal compression in northwestern - southeasterly direction and the field of local

stresses.

In connection with foregoing, in Tashkent epicentral zone it is possible to previously isolate the earthquake-hazard discontinuities, within limits of which is most probable the emergence of earthquakes in the future (Fig. 204).

Page 416.

Catalog of the earthquakes, which occurred in Tashkent in 100 summers (1866-1965).

(1) Дата	(2) Время, час., мин., сек.	(3) Координаты φ	λ	M	K	(4) Сила, баллы	(5) Источник
				1866 г.			
(6) Июль						3	(7) Халфин, 1949
				1868 г.			
23. III	02,15					7	Бутовская и др., 1964 (8)
4. II		41,0	69,0		14—15	7	Бутовская и др., 1964 (8)
4. IV	22,40	41,1	70,0	$6^{1}/_{2}$	15	7—8	Бутовская и др., 1964 (8)
				1883 г.			
14. XI	17	40,5	72,8	$5^{3}/_{4}$	14	4	Бутовская и др., 1961 (8)
				1885 г.			
22. VII						2	(7) Халфин, 1949
				1887 г.			
29. XI						7	Репников, 1939 (9)
				1886 г.			
28. XI	23,00	40,1	69,8	6	14—15	7	(8) Бутовская и др., 1964
				1888 г.			
28. XI		40,3	69,7	$6^{1}/_{2}$	15	6—7	(10) Землетрясения в СССР, 1961
				1895 г.			
18. XII	17,00	40,2	72,0			4—5	(11) Рыжков и др., 1963
				1896 г.			
15. I						3	Бутовская и др., 1964 (8)
27. IX	09,41	39,6	73,6	$5^{1}/_{2}$	14	4	Рыжков и др., 1963 (11)
24. XI	12,52					3—4	Рыжков и др., 1963 (11)
				1897 г.			
17. IX	15,31	39,7	69,0	$6^{1}/_{2}$	15	6—7	Бутовская и др. 1964 (8)
17. IX	17,38	39,7	69,0	6,3		5—6	Бутовская и др. 1964 (8)
				1902 г.			
16. XII	06,05	40,7	72,4	$7^{1}/_{4}$		5	Рыжков и др., 1963 (11)
				1907 г.			
15. IX	17,45	40,3	72,7	$6^{1}/_{2}$	15	4	Бутовская и др., 1961 (8)
21. X	08,00	38,6	68,0	$7^{1}/_{2}$		5	Рыжков и др., 1963 (11)
				1908 г.			
31. I	04,50	42,8	71,3	$5^{1}/_{2}$		4	Бутовская и др., 1964 (8)
26. II	13,26					3	Горшков и др., 1941 (12)
24. III	22,00	41,0	71,0	5		4	Бутовская и др., 1964 (8)
16. IV	22,39					4	Горшков и др., 1941 (12)
23. IV	16,54					3	Горшков и др., 1941 (12)
24—25. X						2—3	Горшков и др., 1941 (12)

Key: (1). Date. (2). Time, hour, min., s. (3). Coordinates. (4). Force, ball. (5). Source. (6). July. (7). Khalfin, 1949. (8). Eutovskaya, etc. (9). Repnikov. (10). Earthquakes in the USSR. (11). Ryzhkov, etc. (12). Is pct, etc.

Eage 417.

Key: (1). Date. (2). Time, hour, min., s. (3). Coordinates. (4). Force, ball. (5). Scurce. (6). Is pct, etc. (7). The same.

(8). Butovskaya, etc. (9). Atlas. (10). Zemletr. in the USSR.

Дата (1)	Время, час., мин., сек. (2)	Координаты (3)		M		Сила, баллы (4)	(5) Источник
		φ	λ				
1909 г.							
27. VI	22,20					4	Горшков и др., 1941 (6)
7–8. VII						7	То же (7)
13. X*	01,05					4–5	"
19–20. X						4	"
1910 г.							
28. VI	05,09					3	"
12–13. XII	16,30					4–5	"
1911 г.							
20. II						3	"
4. VII	23					6	"
11. VIII	12,15					2–3	"
1912 г.							
24. I	00,37,38					4	"
1. VI	05,10					4	"
25. VIII	02,35					4	"
29. XI	01,30					5	"
24. XII	20,02	38,3	70,0			4	"
1914 г.							
1. I						5	"
24. II	20,30	38,5	70,0			4	"
3. IV	20,22	41,5	70,1	5		3	"
12. V	13,06					3	"
8. VI	09,47					4	"
18. X	20,30	40,7	73,1	5		3	Бутовская и др., 1961 (8)
26. XII	06,37	43,0	75,1			2–3	Атлас, 1962 (9)
31. XII	3	41	72,3	4		3	Горшков и др., 1941 (6)
1915 г.							
5. I	09,38					4	Горшков и др., 1941 (6)
10. I	09,39					5	То же
10. IV	04,10					3	То же (7)
10. II	23,00					3	Бутовская и др., 1961 (8)
1916 г.							
5. VI	23,54					4	Землетр. в СССР, 1961 (10)
1917 г.							
19. I	07,19					3	Горшков и др., 1941 (6)
21. VI	08,48					3	То же (7)
1918 г.							
26. VII	06,00					4	"
1. XII	10,37	39,0	71,0			3	"
1919 г.							
3. II	15,48					4	"
15. VII	23,00					5	"
1920 г.							
9. VII	02,08					4	"
1921 г.							
6–7. I	20,01					3	"
2. III	06,36					3–4	"
15–16. III	20	39,4	69,2			5	"
19. V	09,57					4	"
14. VIII	19,53					4–5	"
15–16. XI						5	"

Page 418.

(1) Дата	Время, час., мин., сек. (2)	(3) Координаты φ	λ	M	K	(4) Сила, баллы	(5) сточник
				1922 г.			
9. IV	10,59					4	Горшков и др., 1941 (6)
6. XII	13,59				9	5	То же (7)
17. XII	01,52	37,0	72,0			5	„
				1923 г.			
21. I	09,52					5	„
19. VIII	24,00					3	„
28. XI	23,11					4	„
28. XII	22,24	40	69,5	6	15	5—6	Бутовская и др., 1964 (8)
				1924 г.			
1. I	20,16					5	Горшков и др., 1941 (6)
3—4. I		39,8	71,2			5	То же (7)
8. I	13,29					4	„
21. V	21,55					4	„
7. VI	21,28					7	Бутовская и др., 1964 (8)
9. VI	01,15					3	Горшков и др., 1941 (6)
10. VI	08,58					5	То же (7)
6. VII	18,33	40,5	73,0	$6^{1}/_{2}$	16	4—5	„
7—8—9. VII						3—4	„
13. VII	18,48					4—5	„
15. VII						3	„
1. VIII	21,22					4	„
13. VIII	18,48					5	„
15. IX	2,36	38,9	70,5	6		4—5	Атлас, 1962 (9)
16. IX	7,30					3	Горшков и др., 1941 (6)
13. X	16,17,42	36,5	70,5	$7^{1}/_{4}$		3—4	Атлас, 1962 (9)
16. X	06,40					5	Горшков и др., 1941 (6)
21. X	21,32					3	То же
				1925 г.			
2—3. I						4	„
8. III	16,30	37,1	71,1			3	„
5. IV	15,26	41,2	71,1	$3^{3}/_{4}$		4	Бутовская и др., 1961 (8)
31. VIII	12,31					3	Горшков и др., 1941 (6)
18. XII	18,10	36,7	71,0	6		4	Атлас, 1962 (9)
				1929 г.			
1. II	17,14,25	36,7	70,8	7		5	Атлас, 1962 (9)
3. VI	20,29,52	43,1	66,7	$6^{1}/_{2}$	16	5—6	То же (7)
4. VI	7,04,53	43,0	66,5	$5^{1}/_{2}$	14	4—5	„
5. VI	9,06,32	43	66,5	$5^{1}/_{2}$	14	4	„
16. X	16,28,00	41,2	68,6	$4^{1}/_{2}$	12	5—6	„
				1930 г.			
12. IX	04,39,05					4	Горшков и др., 1941 (6)
22. IX	16,26,40	38,6	69,4	$5^{3}/_{4}$		2—3	Землетр. в СССР, 1961 (10)
12. X	15,06,41	40,2	69,3	4	13	3—4	Бутовская и др., 1964 (8)
14. X	07,15	40,8	69,3			3	Горшков и др., 1941 (6)
31. X	21,31,47	42,7	70,7	$4^{1}/_{4}$		3—4	Бутовская и др., 1964 (8)
25. XII	18,50					4	Горшков и др., 1941 (6)
1. XI		42,3	71,0			3	Горшков и др., 1941 (6)
				1931 г.			
19. I	9,27,25	36,5	71,0	$6^{1}/_{2}$		4	Землетр. в СССР, 1961 (10)
16. XI	6,15,10	39,7	69	$4^{1}/_{2}$	12	5	Атлас, 1962 (9)

Key: (1). Date. (2). Time, hour, min., s. (3). Coordinates. (4). Force, ball. (5). Source. (6). Is pot, etc. (7). The same.

(8). Butovskaya, etc. (9). Atlas. (10). Zemletr. in the USSR.

Page 419.

Дата (1)	(2) Время, час., мин. сек.	(3) Координаты φ	λ		К	(4) Сила, баллы	(5) Источник
1932 г.							
5. II	06,40,52	41,0	72,0	4³/₄	13	3	Бутовская и др., 1964 (6)
2. X	3,22,05	41,4	65,6	5³/₄	14	4	Атлас, 1962 (7)
1926 г.							
8–9. III						5–6	Бутовская, 1961 (7)
23. III	22,50					4–5	Горшков и др., 1941 (8)
11. IV	6,26,24	39,0	71,0			4	Атлас, 1962 (9)
26. V	14,41					2–3	Горшков и др., 1941 (10)
29. V		40,9	73,0	5³/₄		3	Бутовская и др., 1961 (6)
16. VII	21,29					3	Горшков и др., 1941 (8)
31. VII	03,43	37,0	71,0			5	То же (11)
30. XI	06,15					2–3	
1927 г.							
20. I	14,00	41,3	70,5			3–4	
18. IV	15,01,55	38,5	71,5	5		4	Атлас, 1962 (9)
1. VII	15,41,50	41,7	69,7			3	Землетр. в СССР, 1961 (12)
6. VIII	14,51,29	41,3	69,6			4	Землетр. в СССР, 1961 (12)
12. VIII	10,22,47	41,0	71,6	5³/₄	14–15	4	Атлас, 1962 (9)
12. VIII	16,16,47	41,0	71,6	5¹/₂	14	3	Землетр. в СССР, 1961 (12)
1928 г.							
19. II	5,16			3³/₄		3	Бутовская и др., 1961 (6)
25. II	17,23,48	30,5	71,0	5¹/₄		3	Атлас, 1962 (9)
10. VIII	15,33,47	36,7	71,0			4	Горшков и др., 1941 (8)
14. XI	09,35					3	Горшков и др., 1941 (8)
2. X	3,22,05	41,4	65,6	5³/₄	14	4	Атлас, 1962 (9)
1933 г.							
9. I	2,01,46	36,5	70,5	6¹/₂		4	Землетр. в СССР, 1961 (12)
20. VI	04,30					3	Горшков и др., 1941 (8)
2. IX	23,30					2–3	Горшков и др., 1941 (8)
9. IX	03,09	40,2	71,5	5		3–4	Бутовская и др., 1961 (6)
9. IX	19,34,21	40,7	71,2	4¹/₂	12	4	Бутовская и др., 1961 (6)
2. XI	23,05,24	41,5	69,2			3	Землетр. в СССР, 1961 (12)
3. XI	22,40,12	40,59	69,46			4	Землетр. в СССР, 1961 (12)
23. XI	13,09,46	42,0	71,9	4¹/₂	12	4	Атлас, 1962 (9)
1934 г.							
18. I	15,47,22	38,9	70,6	4¹/₄		4	То же (11)
19. VI	8,59,22	41,8	70,4	4¹/₄	12	4	
39. VIII	15,46,54					5	Землетр. в СССР, 1961 (12)
18. XI	3,21,20	36,4	70,7	6¹/₂		4	То же (9)
12. XII	3,16,28	39,4	70,9	4¹/₂		3–4	
1935 г.							
3. II	7,10,40	36,5	70,5		6	4	Горшков и др., 1941 (8)
17. IV	17,29,48	41,2	69,6			4	Землетр. в СССР, 1961 (12)
5. VII	17,53,00	38,2	67,4	6	6	3	Землетр. в СССР, 1961 (12)
6. VII	23,55					3–4	Горшков и др., 1941 (8)
8. X	9,19,06	38,8	70,8	6		3	Землетр. в СССР, 1961 (12)
11. X	4,20,15	36,3	70,4	5³/₄		3–4	Землетр. в СССР, 1961 (12)
1936 г.							
29. VI	19,10	38,0	70,0			5	Горшков и др., 1941 (8)
9. IX	10,11,58	41,3	69,4			3	Землетр. в СССР, 1961 (12)
25. X						3	Горшков и др., 1941 (8)

Key: (1). Date. (2). Time, hour, min., s. (3). Coordinates. (4). Force, ball. (5). Source. (6). Butovskaya, etc. (7).

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(1) Дата	Время час., мин., сек. (2)	Координаты (3) φ	λ	M	K	Сила, баллы (4)	(5) Источник
			1937 г.				
27. IV	15,39,46	39,6	71,5	$4\frac{1}{4}$	12	3	(6) Бюлл. ЦСС «Ташкент» 1937
14.	10,58,10	36,6	70,7	$7\frac{1}{2}$		4–5	Бюлл. ЦСС «Ташкент», 1937 (6)
18.	13,18	42,1	70,9	6	15	6	Атлас, 1962 (7)
			1938 г.				
21. III	13,11,44	39,6	69,8	$4\frac{1}{4}$		2	(6) Бюлл. ЦСС «Ташкент», 1938
	17,58,09	41,3	69,3			5–6	Бутовская и др., 1961 (7)
22. XII	21	41,2	71,5			3–4	Бюлл. ЦСС «Ташкент», 1938 (6)
			1939 г.				
30. V	10,08,06	38,9	70,4	$5\frac{3}{4}$		3	(6) Бюлл. ЦСС «Ташкент», 1939
10. IX	2,06,45	41,4	71,2	$4\frac{1}{4}$	12	3	Атлас, 1962 (8)
21. XI	11,01,46	36,3	70,6	6,9		3	Бюлл. ЦСС «Ташкент», 1939 (6)
			1940 г.				
28. VIII	20,77,36	41	71	$4\frac{1}{2}$	12	4	Атлас, 1962 (8)
			1941 г.				
18. I	16,36	40,8	71,6			4–5	(6) Бюлл. ЦСС «Ташкент», 1941
6. V	16,55,29	39,5	70,5	$5\frac{1}{2}$	13	4	Бюлл. ЦСС «Ташкент», 1939 (6)
13. VIII	00,55,49	40,8	71,4	5		4	Бутовская и др., 1961 (7)
			1942 г.				
8. I	13,31,20	39,4	72,9	5		2	Атлас, 1962 (8)
18. I	16,36,31	41,1	71,6	$5\frac{1}{2}$		4–5	Бутовская и др., 1964 (7)
8. V	8,39,06					2	Бюлл. ЦСС «Ташкент», (6) 1942
24. XII	15,36,40					2	То же (9)
			1943 г.				
11. I	19,51,18	38,7	69,3	6		4	То же, 1943 (9)
12. I	9,05,09	38,7	69,3	$5\frac{1}{2}$		2	.
12. I	10,41,42	38,7	69,3	5		2	.
28. II	12,54,35	36,8	70,8	7		2	.
4. IV	18,45,30					4	Землетр. в СССР, 1961 (10)
21. V	09,01,49					4	Землетр. в СССР, 1961
6. VI	12,53,26					2	Бюлл. ЦСС «Ташкент», 1943 (6)
9. IX	04,06,13	36,3	70,8		$6\frac{1}{4}$	3	.
15. X						2	.
12. XII	15,54,20	36,5	70,5		$5\frac{1}{2}$	2	Атлас, 1962 (8)
28. XII	14,56,30	37,8	71,2		$4\frac{1}{4}$	2	Бюлл. ЦСС «Ташкент», (6) 1943
			1944 г.				
15. III	05,03,53	39,7	73,1	$5\frac{3}{4}$	14	4	То же, 1944 (9)
15. III	06,17,21	39,6	73,0	$5\frac{1}{2}$	13–14	3	.
27. IX	16,25,02	39,0	74,8	$6\frac{1}{2}$		2	.

Page 421.

Дата (1)	Время, час., мин., сек. (2)	Координаты (3) φ	λ	М	К	Сила, баллы (4)	(5) Источник
			1946 г.				
27. II	8,47,16	40	70,5	4	12	3—4	Атлас, 1962 (6)
2. XI	18,28,30	41,9	71,9	$7\frac{1}{2}$	17	7—8	Бутовская и др., 1964 7
9. XII	5,19,21	42,0	72,0	$4\frac{1}{2}$		3	Бюлл. ЦСС «Ташкент», 1946 8
28. XII	01,52,16	42,0	72,0	$4\frac{1}{2}$		3	То же 9
30. XII	17,53,19	39,5	71,2	4		3	.
31. XII	2,20,51	41,9	72,3	$4\frac{1}{2}$		3	.
			1947 г.				
13. I	20,49,13	41,8	72,5	4		3	Бюлл. ЦСС «Ташкент», 1947 8
18. I	01,10,46	41,9	72,0	4		3	Бюлл. ЦСС «Ташкент», 1947 8
8. IV	00,06,50	42,8	72,1		12	3	Бутовская и др., 1964 7
9. IV	21,14,41	41,9	72,4	$4\frac{3}{4}$		3	Бюлл. ЦСС «Ташкент», 1947 8
1. VI	18,56,51	41,0	72,3	5	13	3	То же 9
2. VI	06,40,33	41,0	72,3	$5\frac{1}{2}$	14	5	.
10. IX	12,02	41,0	72,3	$5\frac{1}{2}$		3	.
			1948 г.				
28. I	15,51,20	36,8	67,2	$6\frac{1}{4}$		2	Бюлл. ЦСС «Ташкент», 1948 8
21. VII	6,10,08	39,48	56,48			2	То же 9
7. IX	8,15,22	38,9	70,6	$5\frac{1}{4}$		3	.
10. IX	12,02,43	42,0	72,0	$5\frac{1}{4}$	13	4	Бутовская и др., 1964 7
21. IX	5,24,52	40,0	70,9	4	12	2	Бюлл. ЦСС «Ташкент», 1948 8
5. X	22,39,37	39,3	71,0	4		2	Бюлл. ЦСС «Ташкент», 1948 8
3. XI	15,02	42,6	70,5	$4\frac{1}{2}$	13	3—4	Бутовская и др., 1964 7
11. XI	16,06,04	39,3	68,6	$4\frac{1}{4}$		3	Бюлл. ЦСС «Ташкент», 1948 8
22. XI	16,09,48	39,3	68,0	$4\frac{1}{2}$		3	Бюлл. ЦСС «Ташкент», 1948 8
			1949 г.				
26. I	00,00,26	40,1	71,4	4	12	3	Бутовская и др., 1961 7
19. II	22,37,05	41,9	72,0	4		3	Бюлл. ЦСС «Ташкент», 1949 8
4. III	10,19,25	36,6	70,6	7		4—5	Бюлл. ЦСС «Ташкент», 1949 8
9. III	04,21,44	41,9	72,2	$4\frac{3}{4}$		3	Бутовская и др., 1964 7
17. III	02,47,59	42	72,7	$4\frac{1}{2}$	13	2	Бюлл. ЦСС «Ташкент», 1949 8
8. VII	07,50,40	39,2	70,8	5		2	То же 9
8. VII	08,02,16	39,2	70,8	$5\frac{1}{2}$		3	.
10. VII	03,58,38	39,2	70,8	$7\frac{1}{2}$		5—6	.
10. VII	14,13,24	39,2	71,1	$5\frac{1}{4}$		3	.
10. VII	15,07,49	39,1	70,9	$4\frac{3}{4}$		3	.
10. VII	15,19,00	39,0	71,0	$5\frac{1}{2}$		3	.
10. VII	15,46,17	39,2	71,0	6		3—4	.
10. VII	16,24,00	39,1	71,0	$6\frac{1}{2}$		4	.
14. VII	3,35,36	39,2	70,7	$4\frac{1}{2}$		2	.
19. VII	17,42,12	39,1	71,1	$5\frac{1}{2}$		3—4	.
23. VII	6,55,56					2	.
31. VII	22,13,14	39,1	71,1	$4\frac{1}{2}$		2	.
9. VIII	21,32,03	39,3	71,1	$4\frac{1}{2}$		2	.

Key: (1). Date. (2). Time, hour, min., s. (3). Coordinates. (4). Force, ball. (5). Source. (6). Atlas. (7). Butovskaya,

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Page 422.

(1) Дата	(2) Время, час., мин., сек.	(3) Координаты φ	λ	M	K	(4) Сила, баллы	(5) Источник
1949 г.							
23. VIII	22,03,54	39,2	71,1	5		3	.
29. VIII	14,32,23	38,9	71,0	5		2	.
6. IX	4,15					2	6 Бюлл. ЦСС «Ташкент», 1949
12. IX	22,00,08	41,3	71,8	3		3	Бутовская и др., 1961 7
20. IX	07,43,52	39,2	70,7	$4^1/_2$		2	Бюлл. ЦСС «Ташкент», 1949 6
17. XI	05,08,20	39,2	70,7	$4^1/_2$		2	То же 8
1950 г.							
9. VII	16,10,24	36,8	71,0	7		3	6 Бюлл. ЦСС «Ташкент», 1950
1951 г.							
6. I	5,17,19	36,6	70,9	7		3	То же, 1951 8
14. IV	04,10,06	39,1	71,6	$5^3/_4$		2	.
12. V	22,07,52	39,6	71,3	$5^1/_2$	14	2	.
29. V	12,59,18					4	Бутовская и др., 1961 7
1953 г.							
15. II	08,08,24	42,2	71,6	$4^3/_4$	13	2	Бутовская и др., 1964
1954 г.							
26. II	18,46,17	36,8	71,3	6		2—3	Бюлл. ЦСС «Ташкент», 1954 6
1955 г.							
15. IV	03,40,55	39,9	74,6	7		3	То же, 1955 8
15. IV	4,13,26	40,0	74,7			4	.
27. IV	11,49,56	39,3	71,8	$4^1/_2$		2	.
14. V	13,35,43	36,7	70,9	$4^1/_2$		2	.
19. VII	08,47,38	39,7	68,0	$5^1/_4$	13	3	Бутовская и др., 1964 7
1956 г.							
6. IV	07,11,36	36,5	70,7	5,8		2	Бюлл. ЦСС «Ташкент», 1956 6
4. X	00,58,29	41,3	68,8	4		2	То же 8
13. X	08,21,08	36,3	71,2	4,9		2	.
14. XI	00,51,30	37	71	6		2—3	Атлас, 1962 9
14. XI	03,56,56	40,5	78,0	$4^1/_2$		2	Бюлл. ЦСС «Ташкент», 1956 6
1957 г.							
4. III	03,28,58	40,5	72,3	4	12	2	То же, 1957 8
10. III	03,30,23	36,6	70,0			2	.
9. V	08,44,19	38,8	70,5	$4^1/_2$		2	.
20. VIII	15,21,11	36,9	71,0	5,8		2—3	.
2. IX	21,21,36	36,5	71,3	6		2	.
2. IX	09,56,53	40,2	71,1	$4^1/_4$	12	2—3	Атлас, 1962 9
1958 г.							
7. I	6,55,54	38,9	70,3	$5^1/_4$		2	Бюлл. ЦСС «Ташкент», 1958 6
28. III	04,09,37	36,6	70,9	5,6		3	То же 8
28. III	12,06,25	36,9	71,0	6,1		3—4	.
8. VIII	12,52,09	36,8	70,8	5		2—3	.

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(7). Eutcvskaya, etc. (8). The same. (9). Atlas.

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(1) Дата	(2) Время, час., мин., сек.	(3) Координаты φ	λ	M	K	(4) Сила, баллы	(5) Источник
			1959 г.				
2. III	15,32,56	37,0	70,5	6		2—3	Бюлл. ЦСС «Ташкент», 1959 6
21. VII	07,56	40,4	67,9	4		2	Бутовская и др., 1964 7
31. VII	19,53,04	38,9	70,4	5		4	Бюлл. ЦСС «Ташкент», 1959 6
24. X	23,40,35	41,63	70,05	5 3/4	14	5	Бутовская и др., 1964 7
			1960 г.				
19. II	10,38,08	36,8	70,4	6,8		4	Бюлл. ЦСС «Ташкент», 1960 6
21. II	23,25,48	40,3	71,5	4	12	2—3	Рыжков и др., 1963 8
23. II	02,09,49	36,7	71,1			2—3	Труды ИФЗ, 196 9
6. VII	05,18,02	36,8	70,5	5,1		3	То же 10
			1961 г.				
20. III	03,30,27	36,7	71,1	5		2	•
7. IV	21,20,49			5,6		3	•
19. VI	17,05,57	37,4	71,7	5,6		2	•
5. IX	06,14,01	38,7	72,7	5,4		2	•
28. IX	05,00,45	36,8	70,5	5 1/2		2	•
10. X	07,34,15	40,54	69,0	4	11	3	Бутовская и др., 1964 7
			1962 г.				
31. I	00,06,41	38,5	70,2	5		3	Бюлл. ЦСС «Ташкент», 1962 6
6. VII	23,05,32	36,8	70,1		15	3—4	То же 10
3. VIII	11,04,05	40,56	73,07	5	14	3	•
12. IX	20,58,13					2	•
27. X	00,02,01	41,2	69,1	3 1/2		4	•
16. XII	02,06,04	40,0	71,3	4 1/2		4	Бюлл. ЦСС «Ташкент», 1962 6
			1963 г.				
18. II	14,26,34	36,4	70,8	5,4		2	То же, 1963 10
10. III	21,48,44	42,7	69,8	3,9	12	2	•
19. X	06,46,35	41,13	71,53	4 3/4	12	3	•
2			**1964 г.**				
. I	14,09,19	36,5	71,0			5	Бюлл. ЦСС «Ташкент», 1964 6
13. II	13,54,11	39,4	73,0	5,3	14	2	То же 10
22. III	23,56,26	40,21	69,45	4,0	11	2	•
23. III	13,40,28	38,3	73,6		12	2	•
6. VII	16,14,51	37,5	71,1	5,6		2	•
16. XI	04,47,29	36,5	70,6		12	2	•
			1965 г.				
14. III	15,54,23	36,4	70,7	7,5	17	5	Бюлл. ЦСС «Ташкент», 1965 6
17. III	13,14,25	40,8	69,5	5,5	13	5	То же 10
13. VI	08,19,25	41,3	70,9	4,5	11—12	2—3	•
26. VII	00,38,49	41,9	69,6	4,5	12	3	•
4. IV	12,02					2	•
16. XI	01,05	41,3	71,1	4,5		3	•
2. VI	21,28,15	42,2	69,5			3	•

Key: (1). Date. (2). Time, hour, min., s. (3). Coordinates. (4). Force, ball. (5). Source. (6). Bulletins CSS "Tashkent". (7). Butovskaya, etc. (8). Ryzhkov, etc. (9). Ryzhkov, etc. (10). The same.

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Page 427. Chapter I.

GEOLOGICAL ENGINEERING CONDITIONS.

Genetic types, propagation, age and the conditions of the occurrence of quaternary deposits.

Quaternary deposits within the limits of the investigated region will lie on the uneven surface of neogene marls and siltstone. The surface of neogene rock/species is characterized by the series of downwarp/troughs and uplift/rises, elongated in essence in south-west direction. In the place of most submerged part of one of the downwarp/troughs, the appropriate approximately axis of the contemporary river-bed of Chirchika (in the region of Kuylyuka), the power/thickness of quaternary covering reaches 300 m.

Towards northeast and north, is noted the common/general/total uplift/rise of bedrocks and, therefore, the ume'sheniye of the power/thickness of quaternary deposits. On the northeastern periphery of the investigated territory (for example on the section of TashGRES) neogene marls very closely approach the topographic surface, and by places in erosive vrezakh they outcrop. One fourth rock/species are represented in essence by deposits r of Chirchik, its inflows, which fill Chirchikskuyu tectonic basin/depression.

The quaternary deposits of the investigated region include the following genetic types: prolyuvial'nyy, alluvial, diluvial, anthropogenic (connected with the construction-economic activity of man).

Prolyuvial'nye deposits.

On genesis prolyuvial'nymi are reddish-gray neogene siltstone, stone loess deposits Nanaian and loess rock/species Tashkent complexes. These deposits compose about 2/3 of entire area of Pritashkentskogo region. They are developed in the northern, northwestern, northeastern and south-west parts of the Tashkent prolyuvial'noy plain. Into north and west, its prolyuvial'nye loess rock/species emerge abroad of city.

The southeasterly boundary of prolyuvial'nykh loess rock/species passes along the are. of Tartaryk (in region the sett. Ordzhonikidze), of st. of Voroshilov, south boundary of Russian cemetery (in the region of TashMI), of st. field-engineer, Rustavelli's Shota to shchya-go journeying. The described rock/species intersect by deep erosive vrezami Bozsu, Karakamysha, Burdzhara, Salara, etc.

Page 428. The power/thickness of the prolyuvial'nykh loess rock/species of Tashkent complex varies within sufficiently wide limits - from 2 to 70 m. By the smallest power/thickness, about 2-5 m, possess the melkczemy, which slope in the northeastern part of the territory, narrow band the being extracted along shores Salara. The highest efficiency, which exceeds 60 or 70 m, the described rock/species possesses on northwest of Tashkent.

The Prolyuvial'nye loess rock/species of Tashkent complex will lie in essence on stone loess deposits of Nanaian age, and by places on the alluvial pebbles of the sections, close to the contemporary valley of Chirchika.

Almost on an entire territory g. of Tashkent under the covering of loess loams is pebble is common yellowish gray, prolyuvial'nyy, drevnechetvertichnyy stone loess deposits with a power to 60 m. In northeastern part it will lie on depth 2-5 m, in northwestern it will lie 30-60 m, while in southeasterly - more than 110 m.

Stone loess deposits at depths of approximately 100 m, by places to 200 m is laid reddish-gray continental neogene the alevrolitai whose power/thickness is measured by hundreds of meters. On the basis of the great similarity of the rocks given above it is possible to assume that their genesis are analogous, i.e., neogene siltstone, obviously, are prolyuvial'nymi, therefore, they can be the ancient analogs of stone loess deposits.

Alluvial deposits.

Alluvial deposits are very widely common in southeasterly part g. of Tashkent and in the valleys of the water flows, which gash prolyuvial'nuyu plain in the form of narrow band. They compose the floodplain, the first, the second, third nadpoymennye terraces r of Chirchik and its inflows, in particular, the water flows, which gash prolyuvial'nuyu plain (Karakamysh, Bozsu, Burdzhar, Salar, etc.). In contemporary valley p. of Chirchik, the floodplain, the first, second terraces are accumulated by great thickness alluvial is pebble whose power/thickness, according to V. A. Zakharevich's data, reaches 300 m.

Floodplain almost without the covering of melkozema, I terrace, which occupies vast area, is covered on top with the fine/thin cheslom of melkozema with a power about 2-3 m, on surface II, which is encountered in the form of separate/individual small islets, the thickness of silt covering reaches 5-7 m, III terrace, sufficiently widespread in the center section of the city, is on top accumulated by laminar alluvial loess loams with a power on the average 20-30 m it is laid by graviynogalechnikovymi alluvial deposits. The alluvial rock/species, which fill erosive vrezy on the surface of prolyuvial'noy plain, are represented by the laminar deposits of loess loams, sandy loam, sand and pebble.

On geological age the floodplain, the first and second terraces are related to syrdar'inskomu complex, the third they is

related to goloдnostepskomu .

Basement rocks of alluvium r of Chirchik are stone loess deposits of Nanaian age. The alluvial deposits, which fill valleys and the gashing prolyuvial'nye plains, are laid by the prolyuvial'nymi loess loams Tashkent or by stone loess deposits Nanaian complexes.

Diluvial deposits.

The described rock/species in the territory of Tashkent are encountered fairly often. They are timed to the slopes of terraces, valleys, ravines, by places with jacket cover/coat the surfaces of dolii and ravines, frequently are encountered on slopes and on the bottom of ravines Karakamysha, Bozsu, Burdzhara and their inflows. The power/thickness of diluvial deposits is variable. The rock/species of the minimum power/thickness (several dozen centimeters, in rare cases - to one meter) are encountered on the slopes of the syrdar'inskogo cycle of steeling-accumulation, several increased power/thickness (it is more than 3-4 m) - of the slopes of more ancient terraces.

Diluvial deposits are represented in essence by loess loams (almost in all cases in the territory of Tashkent as mother rock for the formation/education of rock waste serve the loess rock/species of foothill prolyuvial'noy plain and the silt covering of the fourth alluvial terrace r of Chirchik). Within the limits of prolyuvial'noy plain, they are laid by prolyuvial'nym loess deposits and loess rock/species, but in remaining territory - by alluvial loess loams and very rarely, on the surface of young terraces, by alluvial pebbles.

The age of the diluvial deposits of the determined thickness to accurately establish/install is difficult, because these rock/species

with places initiated to be formed after the deposit of loess deposits of prolyuvial'noy plain and they continue to be developed at present. Consequently, the lower part of the determined diluvial thickness began to be form/shaped into srednechetvertichnoye time average - into golodnostepskoye upper - into syrdar'inskoye a of the surface of the Earth - at present. Diluvial deposits on the slope of younger terraces, it is natural, they initiated to be formed after the appearance of a slope of this terrace and they continue to be developed now.

Besides the pure genetic types of rock/species pointed out above, in the limits of the region of investigations are encountered the mixed types - diluvial-prolhvial6nye, alluvial-diluvial, etc.

Anthropogenic deposits.

These deposits include different forms of filled soils (the fact that frequently is called cultural layer), facies of channels and artificial lakes. They are formed as a result of the construction engineering and economic activity of man. They will lie on the quite upper part of the earth's surface and within the limits of city are laid by the quaternary deposits as which frequently serve the loess rock/species.

For the lifetime of city (it is more than 2000 summers) in the regions of ancient building-up, anthropogenic deposits formed

continuous covering by thickness to 10-12 m. Considerable according to power/thickness (it is more than 10 m) anthropogenic deposits were accumulated also in ancient irrigational channels Bozsu, Salar, Karakamysh, Chorsu, Dzhangob, Zakh, etc.

In the territory of Tashkent, is isolated two complex of the anthropogenic deposits: filled, facies of channels and artificial lakes.

Page 430. The first complex unites the following historico-genetic types and the forms of the filled soils: the deposit of ancient and contemporary buildings-up, ancient defensive military-fortress installations (residue/remainders and buried fortress walls, mounds, etc.), roads, road mounds, the filled soils of earth embankments and dams, wastes of ancient and contemporary production, the filled soils of former and contemporary cemeteries, deposit of the filled up valleys of channels, ravines, quarries.

The deposits of ancient and contemporary buildings-up are most common. They are developed predominantly in the zone of old Tashkent, especially in the regions of action-djuva, Khadra, Chorsu, Sheykhantaur. Here predominate power/thicknesses 2-8 m. The base mass of these soils consists of the unconsolidated, heterogeneous loams and sandy loams. Frequently are encountered the fragments of ceramics, brick, by kamnyametallolom the, etc

The filled soils of defensive and military-fortress installations are reveal/detected in the regions of action-djuva, Kukcha, Beshagach, Samarkand-darbaza, etc., furthermore, on the outskirts of city in the region of Yunusabada, Pakhtamakhalli, Chilarzara, etc. They consist of the destroyed and buried clay walls, the laying of raw brick and earth mounds. Power/thickness by their places 4-5, is more frequent than 7-8 m.

Other forms of filled soils are locally common and do not have vital importance to evaluate the seismic effectiveness of territories.

They are observed in all ancient channels of city, are more widely are common in valleys Bozsu, Salara and Karakamysha. The deposits of channels in these valleys form the longitudinal intermittent terraces whose quantity reaches to 3-4. In valley to Bozsu these terraces are accumulated in essence by sandy loams and loams with a power 3-4 m, rarely to 10 m, in the valleys of Salara and Karakamysha - by sands and the pebbles, covered from above with the layer of sandy loams and loams, with a power to 2 m.

Anthropogenic deposits in the territory of city are form/shaped also at the present time, for example the filling (filling) of the places of former quarries with construction debris after Tashkent earthquake 1966. one of such quarries whose length is about 1500 m, whose width is is more 700 m, and whose depth is 7-10 m, arrange/located the east of Yunusabada (of abrasive plant), is bygone is filled already to autumn 1966.

Composition, state and properties.

Granulometric composition.

During the determination of grain size of loess rock/species, it is revealed, that almost all specimen/samples IV prolyuvial'noy terrace have similar properties. The loess rock/species of lower (II-III) alluvial terraces are somewhat are peculiar and differ from the loess rock/species IV terrace in terms of the larger content of

arenaceous fractions, by the less content dusty and by small zavyshennost'yu in the content clay fractions.

So, the average content of dusty fractions in the prolyuvial'nykh loess rock/species IV terrace varies within the limits 69.5-79.5 , in alluvial loess rock/species III terrace - 58.8-79.1, whereas in rock/species II terrace - 55.5-64 . The average content of arenaceous fractions changes respectively: from 3 to 9 , from 6.6 to 27 , from 15 to 23.5 . In the composition of prolyuvial'nykh loess rock/species, the content of clay fraction amounts on the average to 12.7-22 , alluvial loess rock/species III terraces - 15.8-20.9 , II terrace - 21.4 .

Thus, the content of arenaceous fractions with transition from prolyuvial'nogo genetic type to alluvial regularly increases, and dusty fractions, on the contrary, decreases.

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Page 431.

On the cross section of bore pits, is observed the abrupt character of a change in the contents of dusty, arenaceous, clay fractions, first increasing, then decreasing, which is explained by the conditions of their formation. On the large part of the city, loess rock/species, especially prolyuvial'nogo genesis, podstiayutsya by stone loess deposits.

According to M. Z. Nazarova's data, in stone loess deposits almost greater the half of mineral particles comprises the dusty fraction whose content varies from 44.26-55.32 to 69.04-84.12o/o. Clay fraction varies within the limits of 5.56-23.26o/o, and arenaceous - 3.65-37.33.

In the granulometric composition of anthropogenic deposits just as in loess rock/species, predominate dusty fractions - 20.81-83.94o/o, arenaceous - 6.27-54.39o/o and clay - 8.76-23.46o/o. Floodplain is accumulated in essence by large (30-40o/o), average

(20-25o/o), fine (10-15o/o) pebble, by sand and sandy loams.

Karbonatnost'.

In the content of carbonates in the prolyuvial'nykh loess rock/species IV, the terraces within the limits of one section, and also between the sections of special differences is not noted, only in separate specimen/samples from different sections it is deflected to that or another side from average. For example in the specimen/samples, selected from the bore pit, arrange/located on st. Lunacharskogo 625 m it is south-east from the point of its intersection with st. Sevastopol, a quantity of carbonates vary within the range of 24-5 to 27.0o/o, average on bore pit 24.6o/o, and on the bore pit, arrange/located on the spot of intersection st. Mukimi with st. academic, it varies from 21.5 to 25o/o, average 22.9o/o. The average content of carbonates or prolyuvial'rym to the loess rock/species IV terrace composes 23.7o/o.

In the alluvial loess rock/species of the II-III terraces, unlike the prolyuvial'nykh, the content of carbonates somewhat understated varies from 15.3 to 24.0o/o into III terrace (average 20.83o/o) and from 13.5 to 24o/o - in II (average 18.5o/o).

In a change in the karbonatnosti with depth both in the prolyuvial'nykh and alluvial loess rock/species of the anthropogenic deposits of any regularity it is not observed.

Mineralogical composition.

Fractions are larger than 0.005 mm. In the composition of this fraction, it enters more than 50 different minerals, but usually they predominate only 7-15 rock-forming, and the others are related to accessory. In the composition of fraction 0.05-01 mm in size/dimension of the prolyuvial'nykh loess rock/species IV the terraces the basic components are minerals with specific gravity/weight less than 2.9 g/cm³, to lot of which it comes from 96.96 to 99.98o/o of weight of the beskarbonatnoy part of the rock/species. The minerals of heavy fraction, i.e., with specific gravity/weight are more than 2.9 g/cm³, they compose a total of 0.02-3.04o/o.

Among the minerals light/lung fraction in terms of the high content differ quartz - from 7 to 53.7o/o (from 100o/o of volume light/lung fraction), feldspar of-ot 0.6 to 29.8o/o.

The fragments of rock/species are from 2.1 to 12.5o/o, nedezintegrirovannye fragments - from 20 to 90.6o/o, muscovite is from 0.4 to 7.5o/o, black mica is from 0.3 to 9.3, chlorite is from single grains to 0.8o/o.

From heavy minerals the increased content is characteristic for group of hematite-limonite - 6.12-49.4o/o (from 100o/o of volume of

heavy fraction), magnetite-ilmenite - 0.5-31.5o/o, hornblende - 7.3-25.8o/o.

Page 432.

The content of zircon, leucoxene, pomegranate, sphene, tourmaline, zoisite, pyroxene (monoklin), of black mica, chlorite is very insignificant.

The minerals of rutile, disthene, corundum, andalusite, sillimanite, glaucophane, actinolite, tremolite, pyroxene (is rhombic) in separate/individual obarztsakh generally they are absent, and in some they are encountered in a quantity from single grains to 1o/o.

In the composition of fraction 0.05-0.1 mm from the specimen/samples of the alluvial loess rock/species of golodnostepskogo age (III terrace) the content of the minerals light/lung fraction varies from 92.44 to 98.42o/o, heavy - from 1.58 to 7.56o/o, and of the alluvial loess rock/species of syrdar'inskogo age (II terrace) respectively - from 95.5 to 98.62o/o and from 0.5 to 2.38o/o.

The content light/lung minerals (fraction are larger than 0.005 mm in diameter) in stone loess deposits (according to M. Z. Nazarov varies from 76.80 to 99.05o/o, heavy - from 0.020 to 0.180o/o.

During the study of the mineralogical composition of the fraction of anthropogenic deposits larger than 0.005 mm in diameter it is revealed also, that it in essence is represented by the minerals light/lung fraction - from 81.33 to 84.05o/o of weight of the

beskarbcnatnov part of the dry rock/species and to insignificantly heavy - 0.48-1.59o/o.

The basic rock-forming minerals as in all genetic types of the different age of loess rock/species, are the minerals light/lung fraction. However, in spite of this, they are less diverse, than the minerals of heavy fraction.

The petrographical composition of Chirchikskogo alluvium is characterized according to data of two sorting point/items: Kuylyukskogo and Sergelinskogo.

On the first the granites compose 17o/o, granodiorite and diorite - 16.7, porphyrites, porphyries, aplites are 24.8, carbonate rocks are 30, sandstones, schists, tuffaceous breccia are 11.5o/o; on the second; granites, granodiorite are 34.2o/o, limestone are 32.2, sandstones are 23.2, metamorphic schists are 4.3, quartzites are 0.4, porphyrites 5.8o/o.

Fractions are less than 0.005 mm. The mineralogical composition of the clay fractions of loess rock/species and anthropogenic deposits g. of Tashkent in essence is given according to G. A. Mavlyanova's data (1958), A. I. Islamova (1961), M. Z. Nazarova (1960), A. M. Khudaybergerova (1963).

The clay fractions of prolyuvial'nykh loess rock/species, stone

loess deposits and anthropogenic deposits consist of hydromica; in some specimen/samples is encountered the rare fire flake-shaped formation/education of montmorillonite. The clay fraction of alluvial lessovinykh rock/species consists of kaolinite and a sufficiently large quantity of quartz, mica and pyrophyllite. Minerals montmorillonite group in alluvial loess rock/species are not reveal/detected.

Thus, the absence of montmorillonite in the loess rock/species of alluvial genesis and its insignificant content in the composition of loess rock/species, stone loess deposits and anthropogenic deposits of prolyuvial'nogogenezisa does not affect a change in their physico-mechanical and water-physical properties.

Gross chemical composition.

The gross chemical composition of the loess rock/species prolyuvial'nogo and alluvial genetic types, and also stone loess deposits and anthropogenic deposits g. of Tashkent is characterized in essence by content SiO_2, Al_2O_3, CaO, CO_2, to lot of which it comes 80-85o/o of weight of dry rock/species. The sum of remaining chemical constituents - Fe_2O_3, MgO, MnO, Na_2O, K_2O, P_2O_5, TiO_2, SO_3 - composes a total of 15-20o/o.

Page 433.

With a change in the depth, is observed a foul language change in the chemical constituents, which is explained by the inconstancy of the transportation agent, and the sufficiently close total contents of separate chemical constituents (SiO_2, Al_2O_3, CaO, CO_2) - by the almost identical composition of starting material.

Water-soluble salts.

The content of water-soluble salts in the composition of the prolyuvial'nykh loess rock/species IV the terrace of the studied territory varies within the limits of 0.44-2.540o/o, average 0.326o/o, of alluvial loess rock/species III terrace - 0.34-1.672, average 0.120o/o, of the alluvial loess rock/species of lower terraces (I, II) - 0.044-0.390o/o, average 0.120.

The rock/species of alluvial genesis differ from the prolyuvial'nogo in terms of the low content of water-soluble salts. Almost all specimen/samples, selected of I, II, III terraces, have the carbonate and sulfate-carbonate types of salting. The Prolyuvial'nye loess rock/species are characterized by sulfate, sulfate-chloride, carbonate-sulfate, sulfate-carbonate saltings.

According to the degree of salting, prolyuvial'nye loess rock/species are related to sil'no-, by slightly- and srednezasolennym, and alluvial are related to nezasolennym, rarely to

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THE TASHKENT EARTHQUAKE (SELECTED CHAPTERS). PART 2.(U)
SEP 76

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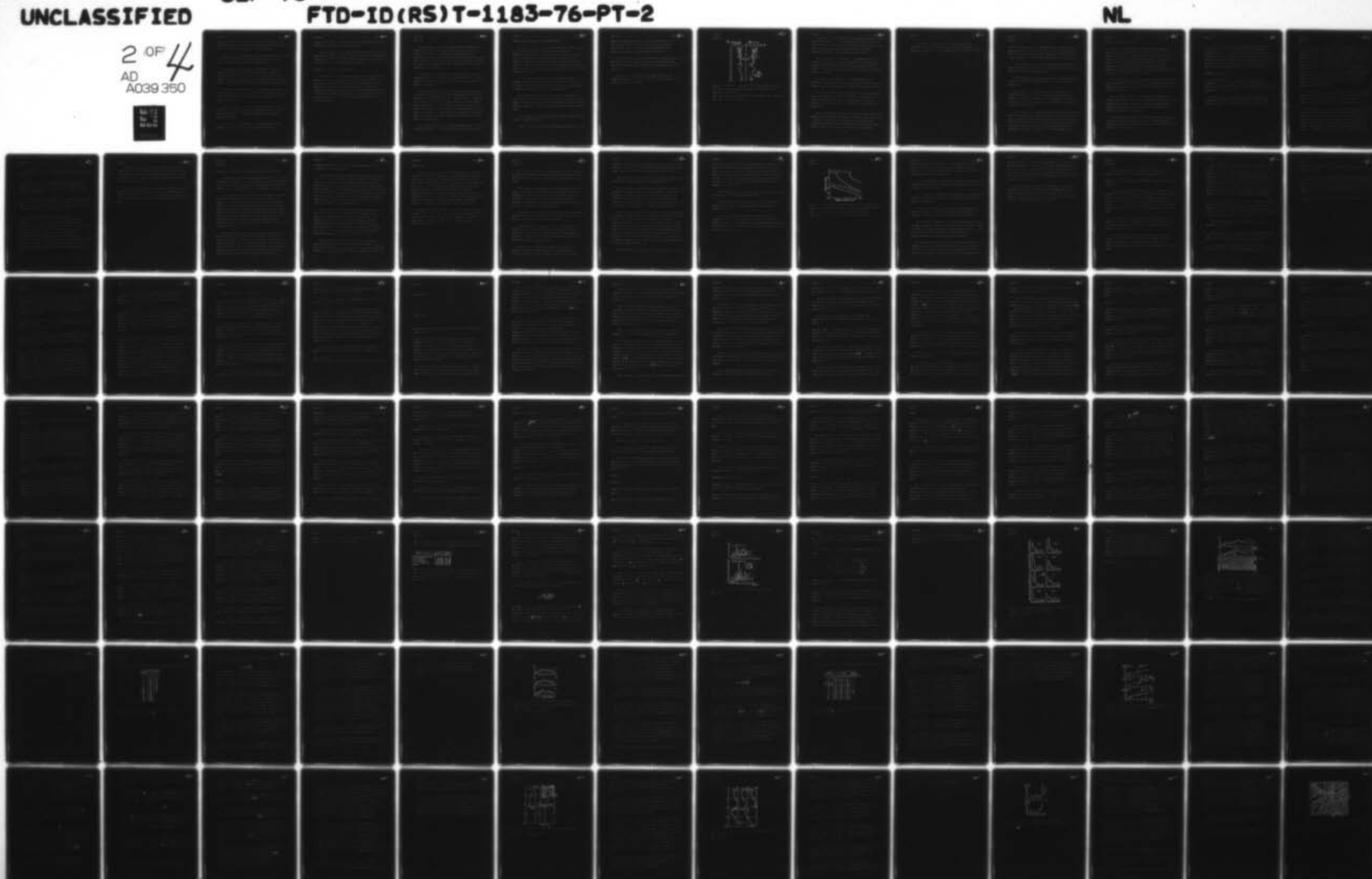

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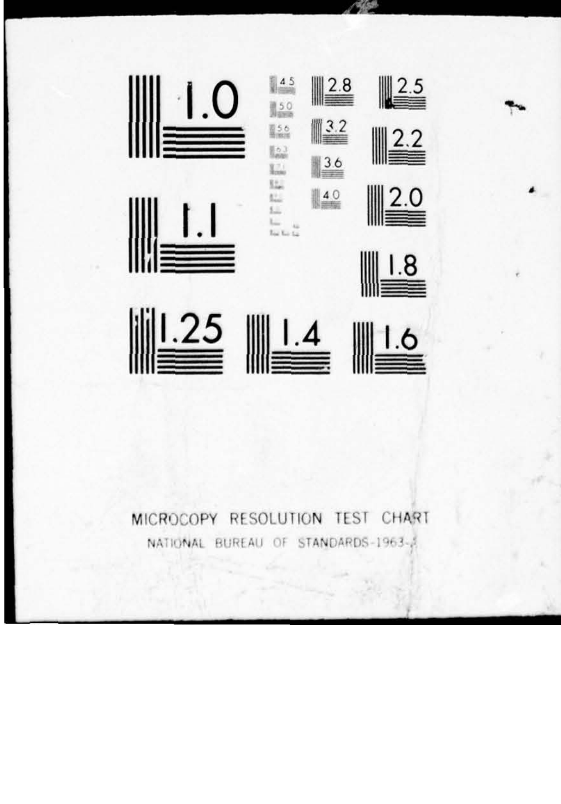

slabczasolennym. In this case, the content of the readily soluble salts in alluvial loess rock/species with depth regularly decreases, but in prolyuvial'nykh changes they are not observed.

However, by places on surface of I, II and III terraces are noted the separate swampy, swampy sections where the content of salts considerably increases, reaching to 2o/o and more.

According to M. Z. Nazarova's data (1960), the content of water-soluble salts in stone loess deposits varies from 0.16 to 0.226o/o, average 0.116o/o of weight of dry rock/species. Type of salting stone loess deposits carbonate, sulfate-carbonate, carbonate-sulfate, rarely sulfate, in essence nezasolennyy or slabozasolennyy.

As notes A. M. Khudaybergenov, the content of water-soluble salts in the composition of the anthropogenic soils of ancient building-up g. of Tashkent oscillates within limits of 0.140-1.884o/o from the weight of dry soil.

The high content of salts is characteristic for the upper part of the layer, with depth its quantity is gradually decreased. Type of salting usually sulfate-carbonate, carbonate, rarely sulfate, khloridnosul'fatnyy.

For the sand and sand-gravelly soils, podstilayuikh alluvial rock/species, it is characteristic from 0.10 to 2.40o/o of

water-soluble salts. Type of salting in essence carbonate, sulfate-cartonate, nezasolennye and slatczasclennye.

From that which was given above it is evident that the content of water-soluble salts, the degree and the type of salting are different, this is explained by the peculiar natural cordition of the formaticn of those or other genetic types of rock/species.

Humidity and water-physical properties.

The humidity of the prolyuvial'nykh, alluvial loess rock/species, stone is loess and anthropogenic deposits in time dependence of year and local natural and artificial sources of humidification changes in the very wide predeakh: in prolyuvial'nykh loess rock/species - 7.40-23.3o/o (average on IV to terrace 16.4o/o); stone loess deposits - 3.32-22.52o/o (11.48o/o0; alluvial - 7.9-25.9o/o (average on III to terrace 16.6o/o, on II - 19.6o/o); filled anthropogenic - 7.05 - 30.82o/o (21.99o/o).

Page 434.

In prolyuvial'nykh as well as alluvial loess rock/species and anthropogenic soils is observed the total regular change in the humidity with depth. The humidity of prolyuvial'nykh loess rock/species on some sections the depth 5-6 m sufficiently high and by places reaches to 21.7o/o, lower than 8-10 m is observed a decrease in its value to 11.3-18o/o, further with 8-10 m and below it increases, reaching even to 27.7o/o.

An increase in the humidity of the upper levels (to 5-6 m) of prolyuvial'nykh loess rock/species is explained by the in a cultured way-economic activity of man, and lower (8-10 m it is below) - by the effect of ground water.

Specific gravity/weight. Depending on mineralogical composition and lithologic varieties, the specific gravity/weight of the studied rock/species is characterized by the following values: prolyuvial'nye loess rock/species - 2.63-2.74 g/cm³, average 2.71 g/cm³, alluvial loess syrdar'inskogo age (III terrace) - 2.70-2.73, average 2.71 g/cm³, golodnostepskogo (II terrace) - 2.71-2.72, average 2.71 g/cm³, stone loess deposits are 2.66-2.78 (on M. Z. Nazarov), fine-grained sands - 2.05-2.75, sandy loams - 2.67-2.69, anthropogenic (filled) soils - 2.62-2.71 g/cm³.

This small difference in the specific gravity/weight of different lithologic rock/species is explained in essence by nearness of the

mineralogical composition of starting material.

The specific weight of the rock/species, which compose territory g. of Tashkent, depending on genesis, geomorphological, hydrogeological conditions is characterized by the different value: in the prolyuvial'nykh loess rock/species of Tashkent age, the specific weight of dry soil varies from 1.20 to 1.65 g/cm³ (average 1.46), the alluvial loess rock/species of syrdar'inskogo age - from 1.34 to 1.62 g/cm³ (average 1.49), golodnostepskogo - from 1.4 to 1.55 g/cm³ (average 1.48).

The specific weight of the dry soil of filled deposits is characterized by values, i.e., 1.26-1.64 g/cm³ (average 1.4). Wastes of ancient handicraft production have the smallest specific weight, 0.83-1.34 g/cm³ (according to A. M. Khudaybergenov),.

The greatest specific weight of dry soil is characteristic for stone loess deposits (according to I. Z. Nazarov) - 1.54-1.95 g/cm³ (average 1.74). The specific weight of fine-grained sands - 1.14-1.90 g/cm³, of sandy loams - 1.69-2.02 g/cm³ (humid) even 1.42-1.62 g/cm³ (dry).

The coefficient of razrykhlyaemosti is pebble it reaches to 1.48, degree of packing 0.9-0.93.

Porosity. As shows the results of investigations (Fig. 205), the

porosity prolyuvial'nykh loess city varies within limits of 38.3-55.7o/o, average (on IV to terrace) 46.0o/o, alluvial - 40.2-50.5o/o, average (on II and to III terraces) 44.5o/o, zntropogennykh deposits (filled soils) 39.0-57.9o/o.

Stone loess deposits are characterized by a comparatively small porosity (from 29.11 to 44.5o/o) and by a comparatively large consolidation, usually value k (index of consolidation) in them is more than 1.

The sand and sand-gravelly soils, which lay under loess rock/species, have values of the porosities: fine-grained sands is 37-52o/o, pebbles are 37-39o/o.

Page 435.

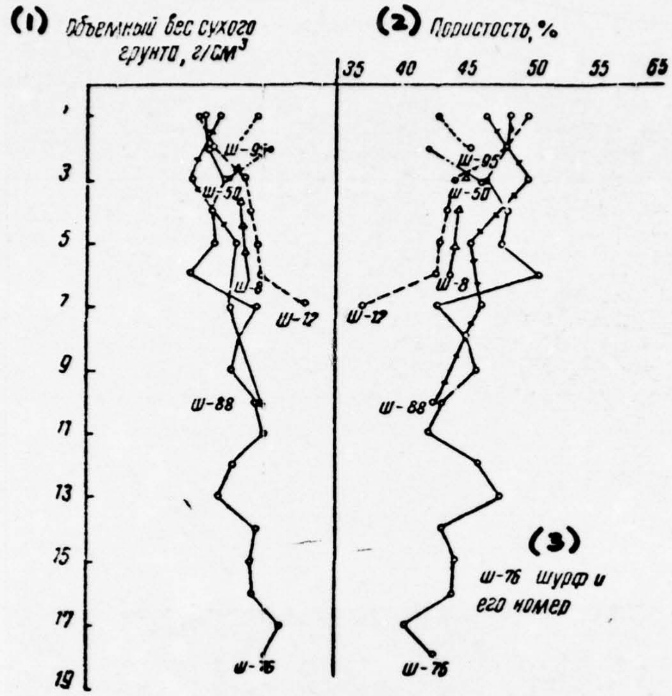

Fig. 205. Character of a change in the specific weight (dry) and in the porosity of alluvial loess rock/species with depth on some sections g. of Tashkent.

Key: (1). The specific weight of dry soil, g/cm³. (2). Porosity, o/o. (3) bore pit and its number.

Plasticity. The moisture content by weight, which corresponds to lower plastic limit in prolyuvial'nykh lessovkh rock/species varies from 16 to 27o/o, average on IV terrace 19o/o, alluvial - from 14 to 22o/o, average on III to terrace 19o/o, on II-16o/o, anthropogenic (filled) - 18.4-33.04, average 22.03o/o.

The upper limits of plasticity prolyuvial'nykh loess rock/species vary from 23 to 41o/o, average on IV to terrace they oscillat 27o/o, alluvial - from 21 to 29o/o, average on III to terrace - 27o/o, on II-23o/o, anthropogenic - from 26.1 to 45.05o/o, average - 28.6o/o.

The number of plasticity in prolyuvial'nykh loess rock/species varies from 6 to 14o/o, average on IV terrace it varies 9o/o, alluvial loess rock/species - from 6 to 9o/o, average - 8o/o.

The number of plasticity of stone loess deposits sufficiently high is characterized by values of 8.8-24o/o. This fluctuation of the value of the limit of the number of plasticity of the studied rock/species is explained by the diversity of their granulometric composition.

The maximum molecular moisture capacity in prolyuvial'nykh loess rock/species is 13-16o/o, in alluvial - 13-14, in stone loess deposits - 14-18o/o. According to V. V. Okhotin's classification both prolyuvial'nye, alluvial loess rock/species and stone loess deposits they are related to the group of the average and heavy loams.

The filtration factors of the studied rock/species were determined under field conditions by the method of infusion, under laboratory conditions they were determined in the instrument of F-1 m.

Page 436.

In data of field studies, the filtration factor of prolyuvial'nykh loess rock/species varies from 0.125 to 0.52 they m/sut, alluvial - from 0.060 to 0.49 they m/sut, while according to laboratory findings - respectively from 0.0009 to 0.165 they m/sut from 0.014 to 0.165.

The filtration factor of stone loess deposits usually does not exceed 0.0001 they m/sut, but cultural layer is equal on the average 0.84 they m/sut (A. M. Khudaybergenov).

The filtration factor of fine-grained sands - 3.0-4.6 they m/sut, is pebble - from 2.5-20.73 (upper layer) to 86.4-129.6 they m/sut (lower layer).

Razmokaemost'. The specimen/samples, selected made of the different genetic types of loess rock/species and sections, are characterized by the different value of razmokaemosti. According to this sign/criterion loess rock/species g. of Tashkent it is possible to divide into four groups.

In the first enter the specimen/samples, gotten soaked completely during 0.30-3 min., in the second - from 3 to 1 min. in the third from 10 to 24 hours, in fourth - more than 24 hours or not at all gotten soaked (stone loess deposits). If the investigated specimen/samples to accept for 100o/o, then to the lot of the first group feels approximately 50-60o/o, the second is necessary 35-45o/o, for the

third and the fourth - 5-15o/o.

Almost all specimen/samples, selected from alluvial loess rock/species and anthropogenic deposits, are related to the first and second groups, and from prolyuvial'nykh - to the first, second and partially to the third. The specimen/samples are, which enter the third group, usually lumpy and dusty-lumpy structures. The specimen/samples, which have higher humidity (it is more than 20-23o/o), get soaked very slowly. This characteristically for stone is loess (it is usually more than 24 hours).

The Razmyvaemost' of loess rock/species in essence depends on their consolidation (cohesive force between particles), the content of arenaceous, clay fractions and readily soluble salts, and also from the content of minerals.

The considerable content of the arenaceous fractions of the readily soluble salts and the presence of the minerals of the group of montmorillonite usually contribute to erosion, but clay fractions (montmorillonite) and the consolidation of rock/species increase resistance to their scouring/eroding.

The getting soaked velocity of loess rock/species in territory g. of Tashkent varies from 0.8 to 1.1 m/s. The eluating gradient, according to data of F. I. Voronova (1938) and E. A. Andrukhin (1937), oscillates from 0.9 to 1.1.

Swelling. The pressure of the bloating of prolyuvial'nykh, alluvial loess rock/species was studied by us under laboratory conditions. As shows the findings, the pressure of bloating in prollyuvial'nykh loess rock/species it varies within the limits 0-1 kg/cm^2, alluvial 0-0.5 kg/cm^2. This small value of the pressure of the bloating of loess rock/species g. of Tashkent is explained by the *mineralogical (hydromicaceous) composition* of clay fractions.

Mechanical properties.

Compression properties (compressive strength). For the characteristic of the compression properties of rock/species, were utilized data of inzhenergeologicheskoy photographing, which was being carried out by us during 1966-1967.

As show the results of compression tests, prolyuvial'nye, alluvial and anthropogenic deposits under the action of natural pressure (and also 3 kg/cm^2) considerably they are compressed.

Page 437.

For example the coefficient of the compressibility of prolyuvial'nykh loess rock/species at natural pressure varies on the average from 0.000 to 0.397 sm²/kg, and the coefficient of relative prosadochnosti on the average from 0.000 to 0.108; in the alluvial loess rock/species of golodnostepskogo age the value of compressibility is equal to 0.004-0.030, relative prosadochnosti - 0.000-0.003. With an increase in the pressure in step/stages to 3 kg/cm² and is more evident that the studied rock/species sufficiently actively react to additional pressure. So, the coefficient of the relative prosadochnosti of prolyuvial'nykh loess rock/species at pressure 3 kg/cm² increases to 0.207, alluvial - to 0.075 (upper terrace) -0.026 (lower terrace).

The coefficient of the prosadochnosti of anthropogenic deposits (filled), in A. M. Khudaybergenova's data, with 3 kg/cm² varies from 0.047 to 0.119, and according to data of Tashgiprogora and Uzgiproshakhta, from 0.000 to 0.099 (was applied formula i =).

Testing filled soils by experimental loads (die/stamp 2500 cm² in area), carried out Uzgiproshakhtom on construction site on st. Komsomol, shows that the total precipitation of soils with the final step/stage (P = 3 kg/cm²) they oscillate from 23.14 to 47.39 mm, whereupon the increase of precipitation to specific loads 1.0-1.5 kg/cm² insignificant (to 8.56 mm), and with the excess of specific loads, i.e., at the subsequent step/stages, is noted sharp increase.

The value of relative prosadochnosti by stone loess deposits does not exceed 0.006.

The porosity stone is loess after experiment it decreases by relatively natural in all by 1.5-2o/o, and of prolyuvial'nykh, alluvial loess rock/species and anthropogenic deposits, its value decreases to 10-15o/o.

The shear strength was determined under conditions of the final packing/seal during natural humidity and saturation by water with the loads: Bh; 1.0; 2.0; 3.0 kg/cm². Shift/shear is carried out in the same normal directions, as packing/seal.

With the laboratory issledovannyakh of soils, established/installed that the soils with natural humidity are characterized by sufficiently considerable cohesive forces, by coefficients, the angle of internal friction. With an increase in the humidity, data pointed out above sharply descend. So, if in prolyuvial'nykh loess rock/species the average value of cohesion/coupling at natural humidity composes 0.377 kg/cm², coefficient of internal friction - 0.592, the coefficient of the angle of internal friction - 30°22', then during saturation the average value of cohesion/couplings is equal to 0.126 kg/cm², coefficient of internal friction - 28°58'.

For alluvial loess rock/species with natural humidity, are characteristic the following average values: coefficient of adhesion - 0.689 kg/cm², coefficient of internal friction is 0.906, the angle of internal friction - 34°42', and during saturation respectively: 0.149, 0.525 kg/cm², 27°44'.

The value of cohesion/coupling anthropogenic deposits, according to data of Uzgiproshakhta, at normal pressure 2 kg/cm² varies from 0.13 to 0.74 kg/cm², the angle of internal friction it oscillat s from 20 to 30°, coefficient of internal friction it oscillat s from 0.36 to 0.58.

Page 438.

GEOLOGICAL AND GEOLOGICAL ENGINEERING PROCESSES AND PHENOMENA.

Geological and geological engineering phenomena in the territory of Tashkent are studied O. K. Lange (1928), by M. M. Reshetkin (1929), by G. A. Arkhangel'skiy (1936), by F. I. Voronov and V. L. Dmitrieva (1940), by A. I. Islamov (1961), by A. M. Khudaybergenov (1963) et al.

In the territory in question are noted the following geological processes and the phenomena: from endogenous - seismic; from exogenous - wind erosion, erosion, suffossion, ovragoobrazovaniye, collapse, sags, slides, bogging up, lithogenesis. These exogenous processes, besides wind erosion, are geological engineering, since they are caused by the construction engineering and economic activity of man (construction irrigational channels, embankments, the glazes of the Earth, the fault of the used sprinkling water, industrial effluents, water leak from water pipes, the digging of trenches, road indentations and, etc).

The wind erosion in the described territory is characterized by the predominance of the processes of the physical destruction of rock/species, which is explained by arid climatic conditions. The principal agents the wind erosion of rock/species are: diurnal and seasonal variations of the temperature of air; alternating/variable humidification and the desiccation of rock/species; the development of the root system of plants and the activity of organisms; the

engineering activity of man they is artificial exposures, the eskcvatsiya of rock/species, etc.

A comparatively powerful development of wind erosion is observed in the neogene siltstone, which emerge on surface in northeastern to the angle of city, and in the nizhnechetvertichnykh stone loess deposits, exposed by the erosive vrezami of ancient channels Bazsu, Salar, Burdzhar, etc. the power/thickness of the crust of wind erosion in these rock/species of approximately 6-7 m. The upper part of it to depth 1 m consists of melkoshchebenchatykh and prismatic fragments. Follows below the layer, broken by the system of the cracks, which crush rock/species to block individualities.

In loess rock/species the wind erosion is revealed weaker. Is more intense wind erosion on the slopes of the erosive vrezov of channels, the slants of road indentations and quarries. Most destructively acts on loess rock/species alternating/variable humidification, the root system of plants and living organisms, especially zemleroi. In exposures these rock/species are broken by the system of the cracks of desiccation, which have frequently vertical direction, by depth to 10 m, by width to 2-3 cm.

Erosive processes within the limits of city are caused by atmospheric precipitation and mainly irrigational flows. Erosion is most strongly developed in loess rock/species in ancient irrigational channels Bozsu, Salar, Burdzhar, Karakamysh, Kal'kauz, Dzhangob, Zakh,

Chukur, etc.

As a result of the erosion of the river-bed of these channels, deeply cut intc into the thickness of loess rock/species, form/shape the peculiar valleys of predominantly V-shaped and U-shaped form. Their depth varies from 5 to 23 m, and width on top it oscillat s from 20 to 150 m. In all channels, except Salara and the Karakamysha, which predominates role plays bottom erosion, in Salare and Karakamyshe - lateral. As a result of the lateral erosion occurs the horizontal drift of the river-bed of channels. The Meandrirovaniye of river-bed especially is strongly developed along two last/latter channels. The amplitude of displacement here reaches 180 m.

Lithogenesis in channels. It is observed in all channels of city - from the large to the fine. Their considerable accumulation occurs on the concave side of the curvatures of river-bed, especially in lower currents and the headwaters of the embankments where the rate of flow of water is slow.

As a result of lithogenesis in the valleys of ancient channels, are formed the accumulative terraces whose quantity reaches to 3-4. They are most well developed on valleys Bozsu, Karakamysh, N. Bozsu, Salara.

These terraces are accumulated in essence by pebble, sand, clay rocks. Pebble deposits are developed in the valleys of Salara and Karakamysha. Total power/thickness their is more than 10 m. The accumulation of precipitation in channels, especially on the headwaters of embankments in main-line channels to Bozsu, Burdzhar, N. to Bozsu, flow/lasts sufficiently intensely.

The filling of channels with alluviums causes severe difficulties during their operation. Therefore on the headwaters of embankments HEP, are conducted systematic decontaminations.

Ovragoobrazovaniye. Developed in essence on the slopes of deep erosive vrezov of channels to Bozsu, N. Bozs, Burdzhar, Ankhor, Karakamysh it is connected predominantly with the expendable into channels used irrigation, technical and sewerage water, atmospheric precipitation plays podchineniuyu role.

Fault into the channels of irrigation and other water is conducted extremely confusedly, without the application/use protivoerozionnykh measures. Therefore the edge of deep valleys,

compose by loess rock/species, rapidly are eroded even by the small streams of tail waters. The size/dimensions of anthropogenic ravines reach 350-400 m in length, 50-60 m in width, 18-20 m in depth.

The form of the cross section of the majority of ravines V-shaped and is U-shaped with abrupt/steep and vertical walls.

By such ravines is crossed the band of the Earth shirinoyu to 450 m along the main-line channels pointed out above. Many ravines in the territory of city and after city are filled or are filled up by industrial and economic wastes. At present deep ravines on the south-west periphery of city are utilized for the dump of debris from the destroyed houses during the earthquake on 26 April 1966.

Suffossion. By suffossion we have called the formation/education of failures in loess rock/species, subsidence on the surface of zamli in the form of funnels, wells and shaft/mines as a result of underground erosion. The essence and the mechanism of this process thus far are not completely clear. However, it is known that such forms are formed because of dissolution and the mechanical carrying out of fine particles by surface and underground water. These phenomena are noted by M. M. Reshetkin (1929), by F. I.Voronov and V. L. Dmitrievs (1940), by G. A. Mavlyanov (1959), A. S. Devryadiani and S. D. Voronkevichem (1961) et al.

Suffozionnye funnels and shaft/mines in the territory of city are

encountered on the surface of high abrupt slopes and slants over the valleys of channels N. Bozs, Karakamysh, Burdzhar and the ravines where can occur the considerable gradients of filtration and the carrying out of the destroyed particles, which usually is caused by the water, which penetrate depthward the Earth or cracks and burrows of zemleroyev. Size/dimension of funnels and wells 0.5-3 m in diameter, 2-6 m into depth.

The harm, brought by suffossion, entails in essence in the strain of slopes, slants and the breakdown of relief.

Tapering of ground water and bogging up. It is observed in valleys Bozsu, Salar, N. Bozsu, Karakamysha, Zakha, Chukura, Burdzhara, etc.

In deep erosive vrezakh underground water emerge at the podnozh'ya of the slopes of valleys to surface in the form of the descending springs. The consumption of separate/individual springs in the headwaters of Salara compose 0.1-0.2 l/s, and in valley to N. Bozs they reach to 0.6-1.0 l/s.

Page 440.

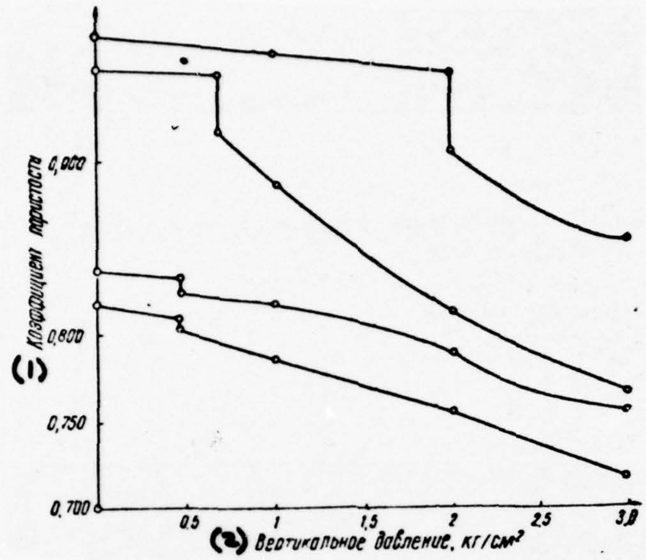

Fig. 206. Compression the compression curves of the specimen/samples, taken from the prolyuvial'nykh (two upper curves) and alluvial (two lower) loess rock/species of some sections g. of Tashkent.

Key: (1). Void ratio. (2). Vertical pressure, kg/cm².

The water-containing tol'yey are the loess rock/species. Within the limits of lower terraces r of Chirchik, is observed the shallow occurrence of the ground water, which are drained in the river-beds of the channels of Salar, to Karasu, etc.

On the lowered/reduced territories of the northern, northeastern and northwestern parts of the city, the ground water will lie closely to surface (at depth 1-2 m).

Here by places are encountered the swampy areas. For lowering in the level of ground water, is specially created the open horizontal drainage grid/network.

Bogging up, furthermore, is observed in the expansions of the floodland terraces of Salara, Karakamysha and their inflows. The extent of the swampy sections reaches 150-200 m, width 20-50 m.

Sags in loess rock/species. The settled phenomena, which appear in loess rock/species during their humidification, are observed within the limits of prolyuvial'noy plain (IV nadpoymennoy terrace). To sags are inclined the loess rock/species, which compose the separate/individual previously neoroshennye elevations.

The phenomenon of sag is noted during hilly elevations on st. of Nakkashlik in the region of Dombrabada, in the region of Yunusabada, Chilanzara etc. Furthermore, in city is known many cases of the deformation of buildings and constructions during the humidification

of their basis/bases, composed by prlyuvial'nymi loess rock/species (building of academic theatre to them. Navoi, the habitable buildings Nos. 26, 28 on st. of Stakhanova, No. 3 on st. Novomoskovsk, etc.). Such settled phenomena, which appear with the external load, created by the weight of the buildings and constructions, M. A. Denisov (1953) it calls supplementary sag.

In data of compression tests, the coefficient of the relative prosadochnosti of the loess rock/species of prolyuvial'noy plain at natural pressure varies from 0.00 to 0.108 (Fig. 206). With an increase in the pressure in step/stages to 3 kg/cm², the coefficient of relative prosadochnosti increases to 0.207.

Page 441.

Thus, prolyuvial'nye loess rock/species actively react to external pressure and give considerable supplementary sag.

INCREASE IN THE SEISMIC INTENSITY DEPENDING ON GEOLOGICAL ENGINEERING CONDITIONS.

The first attempts at the determination of an increase in the seismic intensity of the territory of Tashkent are conducted in 1953 by I. N. Burstein, then in 1960 by A. I. Islamov, in 1966 by V. M. Mirzaev et al. by V. M. Mirzaev produced seismic city planning of territory g. of Tashkent where the increase in the seismic intensity was determined depending on the ground conditions of the territory of city.

An increase in the seismic intensity have is made we for improvement and refinement previously comprised diagrams on the basis of new data, poluchenykh during detailed geological engineering investigations 1966-1968.

Makroseysmicheskiye and instrument/tool data show that the seismic effect in different parts parts of the city is exhibited differently. This is confirmed also by the results of the makroseysmicheskikh investigations of Tashkent earthquake 26 aprelya 1966.

The different effect of earthquakes in a comparatively small territory is caused by the character of the medium on which are propagated seismic the waves (composition and the properties of rock/species, the condition of their occurrence, the presence and the conditions of the occurrence of water-bearing horizon/levels, the special feature/peculiarity of relief). An increase in the seismic intensity produced by us depending on these factors. The degree and the character of the effect of each of them on the seismicity of territory are determined by experimental data of S. V. Medvedeva (1962) and the institute of seismology the A.S. of the Uzb.SSR.

On the basis of analysis and comparison of makroseysmicheskikh data with geological engineering, established/installed that to territories with the average seismic conditions corresponds the field of the propagation of thickness is pebble - the surface of floodplain, I and II nadpoymennykh terraces g. of Chirchik.

Thus, these territories are characterized by the value of increase, equal to zero.

Point of emergence to surface semirocky nizhnechetvertichnykh stone is loess and neogene siltstone is more favorable in seismic relation and it has a value of an increase in intensity -1.

The territory of the propagation of great thicknesses of dry loess rock/species of occurrence of ground water below 5 m deep is

related to less favorable regions with the value of an increase in seismic intensity +1.

The sections of the wide development of filled soils and deposits of channels with a power 3 m and more are least favorable, the value of increase +2. By the same value are characterized the sections of the irrigated loess rock/species, filled soils and deposits of channels of occurrence of ground water less than 5 m deep.

Is given below the short characteristic of the chosen seismic sections.

Page 442.

1. Sections with the value of an increase in seismic intensity 0 occupy almost entire southeasterly part of the city, which in geomorphological relation is the area of the propagation of floodplain, I, II nadpoymennykh terraces r of Chirchik. The surface of these terraces is even. Here enter the regions of Kuylyuka, Karasu, Uzgarysh, etc.

Terraces are accumulated by great thickresses alluvial is pebble syrdar'inskogo complex from above covered with the jacket of loams and sandy loams with a power 1-3 m.

The increases between the dry and irrigated pebbles we have not determined, since the instrument/tool seismic investigations, carried out by the institute of seismology, show the here almost identical effect of seismic waves.

2. Section with the value of an increase in the seismic intensity - 1 is arrange/located the small area of the northeastern part of the city, which stretches itself along shores Salara and to Bozsu. This section is the area of outcrop of semirocky siltstone rock/species within limits of IV nadpoymennoy terrace r of Chirchik. Its relief slabovolnistyy is dismembered by the erosive vrezami of Salara, to the Bozsu also of their lateral inflows whose depth is up to 5-10 m, and whose width is to 80-120 m, with gradient to the side of the indicated water flows.

Region is complex by the neraschlenenymi neogen-quaternary siltstone, semirocky, cracked, with a power more than 200 m. Siltstone are covered on top with the small layer (1-3 m) of loess loams with the seams of gravel.

Ground water will lie on depth 2-3 m and are form/shaped because of surface irrigation water. Irrigated are the upper clay loam mantles and the sandy loams with lenses and seams of gravel, which cannot be used as the natural basis/bases of constructions. The underlying siltstone serve as vodcuporom, also, due to the fracture of the upper part (0.5-3 m) humid, with depth their humidity it decreases.

3. Sections with the value of seismic intensity +1 occupy the central, northwestern and western parts of the territory of city - the regions of the garden of revolution, st. of Engels, Timiryazeva, working town, masses of Chilanzar, Aktepa, Yunusabad, high-voltage, Beshkayragach, Studgorodok, Academgorodok, etc. These sections are arranged to III and IV nadpoymennykh terraces whose surface is characterized by predominantly hilly, by places by corrugated relief. In their geological structure it takes part in essence of the tol'a alluvial, with a power 10-30 m (III nadpoymennaya terrace), and prolyuvial'nykh, with a power 10-70 m (IV terrace), loess rock/species. They are represented by predominantly uniform, slightly humid, porous loams and sandy loams.

Ground water will lie on depth 5-25 m.

4. Sections with the value of seismic intensity +2 are arranged in the center section of old Tashkent - the area of Khadra, action-djuva, October market, Chorsu. They are accumulated from surface by filled soils with a power 3-8 m. Relief weakly corrugated, alternating with the vrezami of the ancient ditchhes of Dzhangob, Chorsu, Zakh, Chukur and by the watersheds between them.

The base mass of filled soils is represented by loams and the sandy loams, often unconsolidated, by places with voids, with the connection/inclusion of the fragments of bricks, ceramics, scrap metal, stones, wood, organic matter, etc. ground water they will lie on depth 5-10 m and more.

5. Sections with the value of an increase in seismic intensity +2 are arranged into predelak IV nadpoymennoy terrace where ground water will lie on depth less than 5 m. This territory is gently inclined lowerings and the valleys of the lateral inflows, ravines along the channels of Salar, Karakamysh (in the regions of Maykurgan, Beshkurgan), to N. Bozs (in the regions of Chaparata, Iza, Katartal, Kattakangly, Ishanguzar).

In the geological structure of region, participate the alluvial being interbedded sandy loams and loams with the intermediate layers

of gravel and sand of golodnostepskogo and syrdar'inskogo complexes with a power with respect to 5-10 and 15-20 m.

The depth of the occurrence of ground water is less than 5 m. By places is observed bogging up.

6. Sections with an increase in seismic intensity +2 occupy the valleys of ancient irrigational channels to Bozsu, Salar, Burdzhar, Karakamysh, Dzhangob, Chorsu, Chukur, Zakh, Kal'kauz, Kichkuruk, the Chapanata and their separate/individual inflows. The depth of valleys varies from 5 to 25 m, width from 5 to 180 m. Their slopes abrupt/steep (60-80°), frequently vertical. Bottoms are accumulated by contemporary alluvial deposits, by the being interbedded sandy loams, by sands, gravel, by overall thickness 2-10 m. Often covered on top with diluvial deposits and different home-economic and industrial wastes.

Ground water will lie on depth less than 5 m. Frequently are observed their outcrops in the form of springs and boggings up.

end of section.

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Pages 444-469.

GEOLOGICAL ENGINEERING DIVISION INTO DISTRICTS FOR INDUSTRIAL AND CIVIL BUILDING.

The first attempt at the geological engineering division into districts of territory g.Tashkerta is conducted in 1934 by A. A. Brodskiy and D. Ye. Gordon. In posleduyushchiye years of the map/chart of geological engineering division into districts for the substantiation of project, gliding/planning Tashkent is comprised by I. G. Kulikov, by V. L. Dmitriev, by G. I. Arkhangel'skiy, by I. G. Burstein and A. I. Islamov.

After the Tashkent earthquake on 26 April 1966, is created the need for mapping of geological engineering division into districts taking into account the new requirements for gradostroitelstva.

As a result of the synthesis of materials composite geological engineering, geological and geomorphological photographings, carried out into 1966-1968, and the investigations of the previous summers produced geological engineering division into districts in the expanded territory of city. In this case, they were guided in essence by the last/latter operating instructions on the composition of geological engineering map/charts (VSEGINGEO and MGU [MГY-Moscow State University], 1966).

As the basis of division into districts, is placed the degree of the suitability of territories for building. The geological engineering sections, which differ from each other according to the degree of suitability for building, are subdivided on geomorfologicheskim sign/criteria, geological-lithologic structure, hydrogeological conditions, property and the character of soils, geological phenomena into the predelakh of the territory of city into three category: suitable, is limited suitable and unsuitable.

The suitable sections are characterized by the undifferentiated, even relief, by sufficiently high strength of the rock/species of basis/bases, by the considerably deep occurrence of ground water. The active development of geological and geological engineering processes and phenomena, adversely affecting the construction, is not observed. Are not required special engineer operations for the preparation of territory for building.

For limited suitable sections is necessary taking different engineer operations due to the settled and low construction conditions of the ground, close occurrence of ground water, dismemberment of relief etc.

The sections, unsuitable for building, differ in terms of especially unfavorable geological engineering conditions and require the expensive engineer operations during building. They include the filled up quarries, ravines, the territory of the active development of geological engineering phenomena (suffossion, erosion, etc.), unstable abrupt slopes etc.

Thus, it is isolated 17 sections. From them 5 are related to suitable, 7. to it is limited suitable and 5 - to unsuitable.

The sections, suitable for building (section I-1), cover the vast part of the prolyuvial'noy plain (IV nadpoymennoy terrace), which is characterized by slightly corrugated, by places by hilly surface with common/general/total gradient to south west. In their geological structure take part the prolyuvial'nye loess rock/species of Tashkent complex $(pl\ Q_{II}^{ts'})$ power/thickness 10-70 m and their underlying stone loess deposits, alevrolitistaya semirocky treshinovataya rock/species and the pebbles of Nanaian complex $(pl\ Q_{I}^{n})$, whose power/thickness varies from 25 to 75 m.

Loess rock/species revealed-settled, preimu'shchestvenno uniform,

slightly humid, porous, loamy, rarely sandy loam, serve as the natural basis/base of the basements of all ground-based buildings and constructions. The depth of the occurrence of ground water varies from 7 to 25 m.

Here during building are not required special engineer operations for the preparation of territory. However, in the process of operation, it is necessary to observe whole the requirement for rule with respect to the control of surface runoff in order that water would not be drd through into the basis/base of buildings and constructions. Seismicity of the section of 9 balls.

Section I-2 is located on the northeastern periphery of city and is outlined along shores to Bozsu, the verkhov'yev of Salara occupies a comparatively small area, which territorial coincides with outcrops of bedrocks. Relief here hilly is dismembered by erosive vrezami Bozsu, Salara and their lateral inflows whose depth is up to 5-10 m, and whose width is to 100-120 m.

Territory is accumulated by the cracked undifferentiated neogen-cetveticnymi alevrolitistymi rock/species of large power/thickness, on top covered nebolshim jacket (1-2 m) of loess loams with the seams of gravel.

As the natural basis/bases of constructions, are utilized the siltstone, which are related to semirocky weakly compressed

rock/species. Depth of the occurrence of ground water 1-5 m. They are form/shaped because of the infiltration of irrigation water.

The water-containing rock/species are the upper clay loam mantles and the sandy loams with the seams of gravel, siltstone serve as vodcuporom. In the places where there are no cover loamy deposits, ground water are absent.

From geological engineering phenomena developed the treshchinoobrazovzniye or slopes. Seismicity of the section of 8 balls.

Page 445. ~~LN3~~ Section 1-3 occupies the area of development III nadpoymennoy terrace, which stretches itself by narrow intermittent band along Lunacharskogo highway, the right shore are. to Karasu, st. Rustavelli's Shoto.

Area relief even, by places is dismembered by shallow erosive decreases. In geological structure take part alluvial loess loams and sandy loams of golodnostepskogo complex $(al\,Q_{III}^{gl})$, uniform, with a power 20-40 m. Lay their pebbles of the same age and genesis with a power 30-40 m.

As the basis/base of buildings and constructions serve loess loams and sandy loams. Loess soils are slabopròsadochnye. Ground water will lie on depth 7-15 m. Seismic intensity of section 9.

Section I-4 covers large part II nadpoymenroy terrace r of Chirchik, arrange/located in the regions of the town im. Shumilova, to Karasu, hippodrome, Kumaryka, etc. The surface of terrace even, is accumulated by thickness (to 20 m) alluvial is pebble syrdar'inskogo complex $(al\,Q_{IV}^{sd})$, , from above these covered with jacket by loam and sandy loams with a power 1-3 m. The pebbles of the average size, well rounded, in petrographical composition predominate the gray metamorphized limestone, sandstones, granodiorite. The depth of the occurrence of ground water varies within limits 3-10 m. Is observed the powerful infiltration of surface water (irrigation and atmospheric precipitation).

In view of the places of the sufficiently close occurrence of ground water with the considerable deepening of basements (it is more than 2-3 m) is assumed to be the water-table elevation of basement locations. In connection with this is recommended the creation of the moisture-proof coatings of basements and walls of basement locations.

Section I-5 is arranged on the left-bank slopes of the valleys of Salara and Karakamysha.

On the left shore of Salara, this section stretches itself in the form of narrow band 100-350 m wide beginning from botanical garden to the point of the intersection of Salara and st. of Kuibyshev, on the left shore of Karakamysha - by band 200-1000 m wide beginning from the

point of the intersection of Karakamysha with st. of Saghan to south-west angle sett. Bel'tepe.

Surface of territories even with flat slope/inclination to the side of the indicated ditchhes. In geological structure take part alluvial loams and the sandy loam of golodnostepskogo complex $(al\, Q_{IV}^{gl})$, uniform, makroporistye, with a power 8-10 m. Along Salara they are laid by pebbles, while along Karakamysha - by coarse-grained sands, gravel, with a power 3-5 m. As natural basis/base serve loess loams and sandy loams. Ground water will lie on depth 5-10 m. Is here developed the scouring/eroding of loess loams, by places with ovragoobrazovaniyem (along the are. of Karakamysh).

In the process of building, can arise the scouring/eroding by surface water of the slants of foundation areas, after building - nonuniform precipitation. Therefore is recommended the control of surface runoff.

Sections is limited suitable for building. Section of II-I - hilly elevations within the limits of prolyuvial'noy plain (IV nadpoymennaya terrace) is arranged in the region of Yunusabada, Aktepa, Chilanzara, Dombrabada, Ishanguzara (lower reaches of the river is the are. of Ankhor) and is nonirrigable mass in view of the hypsometrically high position above the surrounding territory. Is complex by the prolyuvial'nymi loess rock/species of Tashkent complex $(pl\, Q_{III}^{ts})$ with a power 20-70 m, that possess high prosadochnost'yu

during humidification - more than 1 m. These soils serve as the natural basis/base of constructions. Seismicity of the section of 9 balls.

Page 446.

Section II-2 covers the gently-inclined lowered/reduced territories in limits of IV nadpoymennoy terrace. These decreases are dolinamii the sayami of the lateral inflows along main-line ditchhes to Bozsu, Karakamysh, Salar.

Relief of the valley of the lateral inflows as a whole even, slabovolnistyy with slope/inclination (20-25°) to the side of the lateral and main-line ditchhes.

In geological structure participate the sandy loams and the loams of golodnostepskogo (by power/thickness 3-5 m) and Tashkent (with a power 10-20 m) complexes. By places on the surface of slopes and along inflows are encountered the contemporary deposits, presented by the unconsolidated, weakly connected strongly moistered sandy loams and loams with a power 1-3 m.

As natural basis/bases can be used loess loams and the sandy loams of golodnostepskogo and Tashkent complexes. This section is characterized by the close occurrence of ground water (1-5 m). During building is expected nonuniform precipitation, the water-table

elevation of basement locations. Seymichnost' of the section of 9 balls. Before building in these territories, are required special engineer operations for a decrease in the level of ground water, the desiccation of soils.

Section II-3 occupies part II nadpoymennoy terrace r of Chirchik. The surface of terrace even, is accumulated in essence by the alluvial pebbles of syrdar'inskogo complex $(al\ Q_{IV}^{sd})$ with a power 6-20 m, from above covered with the jacket of loams and sandy loams of the same age with a power 1-2 m.

As the basis/base of constructions serve pebbles. This section differs in terms of the close occurrence of the level of ground water - 0.5-2 m. Territory is covered with the grid/network of the open horizontal drainages. Is observed the tapering of ground water on drains and by places zabolchivaniye. Seismicity of the section of 8 balls.

The conditions of building here can be complicated by the inundation of foundation areas, after building - by the water-table elevation of the basements of basements. Is recommended equipment/device of vertical drainages for lowering in the level of ground water, waterproofing basements and walls of basements.

Section II-4 covers both right-bank and levoberzhnuyu I nadpoymennuyu terrace r of the Chirchik which is located on the

southeast of Tashkent in the region of Kuylyuka, plant of large-panel block/module/units.

The surface of terrace even, slightly corrugated, is accumulated by the thickness alluvial is pebble syrdar'inskogo complex with a power 7-8 m, on top covered with the small layer (0.5-1.5 m) of loams and sandy loams. As the basis/base of constructions serve pebbles. Depth of the occurrence of ground water 1-3 m. During building there can be the inundation of basements and foundation areas.

On engineer training territory, are required the same measures as for the preceding/previous section.

Section II-5 occupies the territories of the continuous development of anthropogenic soils with a power 3 m and more, widespread in the zone of the ancient building-up of Tashkent, and also small areas in regions of Beshagach, st. proletarian, etc. Their surface slabovolnistaya, that alternates with the vrezami of ditchhes (channels) and watersheds.

The base mass of filled soils is predominantly represented by loams and the sandy loams, frequently unconsolidated, by places with voids. In the form of connection/inclusions, are encountered fragments of bricks, ceramicists, stones, scrap metal, wood, organic matter, etc.

Page 447.

Filled soils are laid by the prolyuvnal'nymi loess rock/species of Tashkent complex.

Here are observed failures and packing/seals. In view of the variegated lithologic composition, the heterogeneous density, the unconsolidated composition, the high content of organic matter, anthropogenic soils possess low construction qualities. In the practice of building Tashkent, are many cases of large nonuniform settling and deformation of buildings and constructions, constructed on these soils. At the same time there are and successful examples of building buildings on the uniform, condensed filled soils (building of Tashgiprogora).

In the majority of cases, filled soils as the natural basis/bases of fundamental buildings and constructions are not utilized. Seismicity of the region of 9 balls.

Section II-6 includes the elevated territories on which were located former cemeteries. In the territory of the old part of the city, is revealed 15 former cemeteries, arrange/located in region Chigataya, xozrat-imam, Sheykhartaura, Beshagacha etc. They all are located of prolyuvial'noy plain (IV nadpoymernaya terrace). Their surface is hilly elevation.

Are here developed artificially converted, dug over "in situ" filled soils with the connection/inclusion of the bones of man, bricks of laying, stones, etc., with a power to 5-6 m, laid under by the prolyuvial'nymi loess rock/species of Tashkent complex with a power 35-40 m. Ground water will lie on depth 15-25 m.

From geological engineering processes are developed failures and the sag of soils. After building in the case of the moistening of these soils, can appear large nonuniform precipitation, failures and connected with them deformations of buildings and constructions. Therefore one should remove/take filled soils, and as the foundations for utilizing the underlying loess rock/species of the undisturbed structure.

Section II-7 - these are artificial hilly mounds ((to Aktepe, etc.) by height 6-8 m, that are the residue/remainders of the destroyed ancient fastened locks (V-VII explosive). Are arranged they in the regions of abrasive plant (Yunusabadskiy Aktepa), of Bakhtamakhallya, Aktepa (Chapanatinskogo), etc.

Hills are accumulated by filled sandy loams and the loams, which consist of the products of the destruction of raw brick, clay wall with the connection/inclusions of the fragments of raw brick, stones, bones, ash, etc., with a power 3-4 m. The upper unconsolidated layer is laid by the uniform condensed earth mound with a power 3-4 mm.

Depth of the occurrence of ground water 15-20 m. From geological engineering phenomena are developed failures and diluvial removal/drift. After building can occur nonuniform precipitation; therefore is recommended the removal of the upper unconsolidated filled layer and use for the basis/bases of the underlying condensed, uniform earth mound. Seismicity of the section of 9 balls.

Sections, unsuitable for building. Section of III-I occupies the valleys of ancient irrigational channels (Bozsu, Salar, Karakamysh, Kal'kauz, Dzhangob, Chorsu, Chukru, Zakh) and of their inflows. The depth of valleys varies from 5 to 25 m, width it oscillat s from 50 to 180 m. They are located in essence in the limits of prolyuvial'noy plain.

The edge of valleys abrupt/steep (>30°), frequently vertical, in cross section have predominantly V-shaped form; are on top covered with the small layer (1-3 m) of diluvial formation/education and with their underlying alluvial loess loams of golodnostepskogo complex ($al\ Q_{III}^{gl}$).

Page 448.

In the structure of the bottom of valleys, take part the contemporary alluvial being interbedded sandy loams, sands, gravniy, overall power/thickness 2-10 m, frequently from above covered with the dumps of different home-economic and industrial departure/withdrawals by

power/thickness 3-6 m. Depth of the occurrence of ground water 0-2 m. In valleys are widely developed the erosion, suffossion, steeling-accumulation, fine collapse, slides, bogging up, the outcrops of ground water in the form of springs.

In the case of building, are expected large nonuniform precipitation, the water-table elevation, slides.

The arrangement/permutation of the civil building on this section not is expedient in view of unfavorable geomorphological and hydrogeological conditions, the lack of strength of soils, instability of slopes, wide development of geological engineering phenomena. Seymicheskaya danger of the territory of 9 balls.

Section III-2 covers the areas, adjacent to the valleys of channels (Bozsu, Karakamysh, Burdzhar) and crossed on the lateral ravines. They stretch themselves along the valleys of the indicated channels by band shirincyu from 100 to 350 m, on both shores. The depth of ravines is 5-20 m. Slopes abrupt/steep (45°), sometimes vertical.

The form of cross section frequently is V-shaped. Section is complex by loess loams and sandy loams in essence of Tashkent complex. Soils on slopes dry, cracked with the voids of zemleroyev.

Depth of the occurrence of ground water 3-10 m. Are developed

the scouring/eroding of loess rock/species in the form of cvragoobrazovaniya, suffossion, diluvial removal/drift, the tapering of ground water.

Building on this section not is expedient in connection with its dismemberment by ravine grid/network.

If necessary for building, are required great earthwork on vertical planning, or the reinforcement of slopes. Seismicity of the section of 9 balls.

Section III-3 occupies the territory, strongly dismembered by deep ravines, arrange/located on the south-west outskirts of city. The depth of ravines reaches 25 m, width 50-60 m. Cross section frequently V-shaped. Slopes abrupt/steep (40°), by places abrupt. In geological structure participate the prolyuvial'rye loess rock/species of Tashkent complex by power/thickness 40-50 m, dry, cracked with the voids of courses zemlerov.

Depth of the occurrence of ground water 1-10 m. On the bottom of deep ravines, they are drained.

Geological phenomena, seismicity and the recommended measures are the same as are shown for the preceding/previous section (III-2).

Section III-4 - these are the filled up valleys of channels, the

ravines, deserted quarries.

The filled up valleys of channels are located near Bozsuyskoy, Burdzharskoy HEP, [TэC] in the region of Chaparata, etc., the filled up ravines are encountered along the valley of Burdzhara, Bozsu, Ankhora (on the south-west outskirts of city). The filled up quarries - in the region of sanatorium "Chinatadskiy" (in Yunusabade, st. Is Parkentskaya), the brick plants NoNo 3, 4, 5.

The filled soils, which fill these lowerings, consist of the dump of the home-economic, industrial and construction departure/withdrawals, which are characterized by unconsolidated composition and variegated composition. Power/thickness their 8-10 m, by places 20 m. Depth of the occurrence of ground water 2-12 m. the seismicity of 10 balls.

Page 449.

Is here developed subsidence of the surface of the Earth as a result of the packing/seal of gruntov.

After building there can be large nonuniform settlings and the destruction of buildings. If necessary for stroitel'stvaa, is recommended the equipment/device of pile basements with their subsidence into the rock/species of natural occurrence.

Section III-5 occupies right-bank and left-bank floodplain r of Chirchik.

The floodplain is characterized by corrugated relief and is accumulated by contemporary alluvial pebbles, by gravel and sands, with a power 4-6 m. By places on large areas are observed the artificial lowerings, formed as a result of yield is pebble.

Depth of the occurrence of ground water 0-1 m.

On this section are observed the inundations of territories, riverbed erosion, by places the accumulation of precipitation.

If necessary for building, are required the expensive engineer operations for the enclosure/protection of territory of inundation, the equipment/device of vertical drainages for lowering in the level of ground water.

Page 450.

Chapter II.

Seismic city planning of territory g. of Tashkent and its suburban zones.

Works on seismic city planning were fulfilled into two stadin.

In first stage (1964-1965) with central seismic station "Tashkent" is comprised and implemented into production the map/chart of seismic city planning of territory g. of Tashkent (V. Mirzaev et al.).

After Tashkent earthquake arose the need for seismic city planning of the suburban areas of city for refinement previously comprised map/chart.

The works of the second stage with the application/use of new methods confirmed previously made conclusions and somewhat refined the map/chart of seismic city planning with the coverage/scope of suburban zone (S. Abdurakhmanov, T. Valiyev, S. Kasymov, I. Lozovich, V. Mirzaev).

Is given below the common/general/total survey/coverage of all accomplished/carried out works for this time.

INSTRUMENT/TOOL INVESTIGATIONS.

Research on seismic oscillation/vibrations in city blocks of city with the aid of automatic recording weak zamletryaseniy.

One Of the basic stages of works on seismic city planning was the investigation of the effect of earthquakes on different soils with the

aid of identical seismic stations start-and-stop during earthquakes.

As it was noted above, in the territory of city, is 5 terrass r of the Chirchik where are develcped sledtyuyushchiye combinations of the soils: loess deposits on marl, loess deposits on pebble, pebble on marl with the different levels of the occurrence of ground water.

Recording earthquakes was carried out in 19 city blocks of city. The selection of point/items for the setting up of seysmometricheskoy equipment was carried out in such a way as to encompass entire set of the available in city geological engineering conditions. In view of the fact that the relief of city relative to spokoynyly, its effect was not accepted into consideration.

For the maximum exception/elimination of the differences in epicentral distances, 4 seismic stations are placed on the profile, perpendicular most dangerous and to the more frequent appearing Chatkal'skoy zone of epicenters.

Page 451.

In this case, the concrete/specific/actual location of each of these stations was selected so that geological engineering cut/sections hearth in terms of them would differ from each other in any one sign/criterion (sochetannyu of the covering and basement rocks, the level of ground water, the power/thickness of the upper thickness

etc.).

On each point/item was establish/installed the time/temporary movable seismic station, equipped with the following equipment: as sensors were utilized the vibrographs of VEGIK with the period of natural oscillations T_1 = 2.0 s. and the fading $\mathcal{D}_1$ = 0.55, as recorder - the oscillographs of OSB-VI-M with the galvanometers of GB-III. Period of the natural oscillations of galvanometers T_2 = 0.2 s., the fading $\mathcal{D}_2$ = 5.0.

Frequency characteristic of stolcobrazra in the frequency range, which is of greatest interest for an engineering seismology (0.1-0.6 s).

Notation was conducted by three channels (N-S, E-W, Z) with increase in 1500-1600. The spread of frequency characteristics and increases in all stations did not exceed 3-5c/c. For obtaining the well read notation of high-frequency speed fluctuations of the scan/development of oscillograph is selected as being equal to 240 mm/min.

The oscillograph with the aid of photoelectronic equipment/device automatically was switched on during earthquake and was disconnect/turned off after its completion. For this, the existing into OSB-VI-M diagram of the automatic breaking of burning is ispolzovana for the realization of the waiting scan/development of

oscillograph; during the function of this diagram with the aid of relay, it was switched on the motor and the illuminator of oscillograph.

The connection/inclusion of automatic seysmostantsii is bygone not instantaneous due to the carelessness of the first arrival of seismic waves, or the inertness of relay, photoresistor and motor of tape-drive mechanism. However as established/installed, delay factor in the majority of cases does not exceed 1 s.

During the study of the behavior of soils during earthquakes greatest interest is of the group of the maximum shifts, which is necessary to transverse wave. Therefore the loss of the first arrival of longitudinal waves virtually is not reflected in the quality of notation and with the quantitative evaluations of seismic effect.

The indicated method of recording earthquakes with the aid of movable seismic stations with avtozapuskom during earthquakes is represented rational in view of cost-effectiveness/efficiency and conveniences (absence of constant working personnel with seysmostantsiyakh, the savings of fotoostsillograficheskoy paper and chemicals, simplicity).

Equipment for all seysmostantsiy before their setting up on the investigated sections is verified to the identity of notation with central seismic station "Tashkent".

The seismogram of TsSS "Tashkent", which works it is continuous, they served as the indicator of the proceeding earthquakes and made it possible to estimate the value of the initial cut of the seismograms of urban automatic stations, missed during function automaton.

Since the stations automatically were switched on only during earthquakes, in each point/item cassette with seismogram it was changed approximately one time during 3-4 days at the signal of TsSS "Tashkent". For the inspection of the work of equipment, the laboratory assistant traveled about all the seismic stations once during 1-2 days and made on the artificially launched seismograms of the mark of the torque/moment of control. Each visit of station was noted in journal with the indication of date and time.

Page 452.

On seismograms were separate/liberated the close earthquakes, yielding to treatment/working. Precise date and time of the emergence of earthquake were establish/installed on the seismograms of central seismic station "Tashkent".

From the very beginning of observations after treatment/working several notations of close earthquakes, it is reveal/detected that the intensity of earthquakes at seismic station 1, arrange/located on the powerful layer of pebble, always is obtained more weakly than at other

stations. Seismic station 1 is accepted as supporting/reference. Subsequently all the calculations of increases in the intensity both according to the notations of earthquakes and according to acoustical stiffness for separate/individual point/items were performed relative to this station. In connection with this were processed the notations of those earthquakes which were recorded by supporting seismic station. Treatment/working was conducted according to "instructions according to dynamic measurements on seismograms" I. L. Nersesova et al. ~~(1966)~~ (1961).

On the notations of earthquakes, were measured the amplitudes, the periods and period of oscillation. In this case, were selected the maximum amplitudes in the interval of periods 0.1-0.6 s. and were compared with the maximum amplitudes of seismic station 1 in this same particular interval.

For each rectangular component, was computed arithmetic mean value of the amplitude ratios. For the calculation of an increase in the intensity, was utilized the notation of that component which gave the greatest average value of the relations of smplitud taking into account a quantity of earthquakes.

On the basis of the seismic activity of the adjacent to city territories, all the recorded earthquakes are divided into two groups: the local (epicentral distance - 0-50 km) and close ($\geq$ 50 km).

RESEARCH ON SEISMIC CONDITICNS OF THE GRCUND ACCORDING TO DATA ON THE VELCCITY OF PROPAGATION OF ELASTIC WAVES.

The Issldovaniya of the consequences of destructive earthquakes show that the elastic properties of the rock/species, which lie at the basis/base of constructions, largely determine the behavior of constructions during earthquake. After reveal/detect/exposeing communication/connection between the velocities of propagation of seismic waves and the elastic parameters of medium, it is possible to obtain the dependence of a change in the intensity of earthquake on the physical conditions of the ground.

For the solution to stated problems, are carried out the observations with the aid of the 24-channel field seismic survey laboratory of PSI-2, established/installed on the on-board motor vehicle of UAZ-451-D. In all experiments were recorded in turn the longitudinal, and then transverse waves by changing the character of the source of excitation and directionality of seismic receivers. For the excitation of longitudinal waves, was utilized the shock of the falling/incident load. by the lift-discarding equipment/device served dismountable metallic tower as height 7 m, as load - sphere 50 kg in weight which was risen by winch and upon reaching of the top of tower automatically was discarded. in this case, it fell in the contact plates, lying on the earth/ground and connected to galvanometer the marks of the torque/moment of shock.

As a result of the analysis of background microseism is selected the filtration of seismic channel 65-90 Hz. Seismic receivers were establish/installed in the earth/ground vertically within each 2 m on profile.

For the excitation of transverse seismic waves, was applied the "revolving door", which is two steel plates 50 x 50 cm. in size/dimension, arrange/located perpendicularly to each other.

Page 453.

This "tail assembly" is welded to the metallic tube of L-shaped form. Setting up to the upper bent part of the duct (crank) was buried into the earth/ground. Shocks were deposited on the end of the crank. The torque/moment of shock was noted by the contact plates, arrange/located on it.

Since the intensity of transverse waves weak vsravnenii with longitudinal and the high-frequency spectrum (65-90 Hz) it attenuated rapidly, in amplifiers was applied the filtration 30 Hz.

Seismic receivers were establish/installed on the profile within 1 m on soil horizontally (" lying"), perpendicular to profile, and they were put some more by the earth/ground.

During recording both the longitudinal and transverse waves, were

observed the following conditions: the overall length of profile was 70 m; the recorded fluctuations were record/written to the photo-paper, moving at a rate of 500-550 mm/s; the sources of excitation and the seismic receivers were arrange/located on straight line; an increase in channels was selected different in the intervals of the subsequent exchanges of seismic receivers depending on their removal/distance on driver; recording was carried out three times: with a small, average/mean and great increase; were utilized the systems of the overtaking and contrary hodographs.

As a result are obtained qualitative, yielding to continuous correlation, notation. Impact effects are sufficiently stable; is observed a good frequency of notation from one shock to the next.

Acoustic measurements are carried out in the following point/item: Kuylyuk are I nakpoymennaya terrace r of Chirchik; st. palvan-ditch - II nadpoymennaya terrace r of Chirchik; central seismic station "Tashkent" - III terrace r of Chirchik; TashGRES (Ca of Tashkent) - IV terrace r of Chirchik.

After Tashkent earthquake the increase in the intensity was determined from acoustic velocities with the aid of the single-channel oscillograph of OSU-1, of simpler, more light/lung and more economical, than SU [CC - Soviet Union] 24P.

The receiving-recording equipment OSU-1 is visual observations.

Accuracy of the measurement of times of the arrival of pervovstupleniy +0.5 s; the passband of vertical usilitslya at the level 0.7-250 Hz. As seismic receivers they were utilized SPÉI-62. Longitudinal vibrations in soils were caused by the shock of sledge hammer against the earth/ground, and signals were received as the vertically established/installed seismic receivers.

Transverse waves were caused by shock or the end of the log, buried horizontally into pit perpendicular to profile. Signal was received as the seismic receivers, established/installed horizontally (" lying"), perpendicular to profile. The breaker point, installed on sledge hammer, includes in the torque/moment of shock the circuit of the waiting scan/development of cathode-ray tube. The travel time was determined directly on tube face from calibrator.

As a result on velocities, are described the ground thicknesses, which slope at depths to 25-35 m. The distance between seismic receivers was varied with removal/distance from the source of the excitation of vibrations from 1.5 to 10 m. The maximum distance between the point/item of excitation and method was equal to 150 m.

The measurements of the velocities of propagation of seismic waves from CSU-1 are carried out in 180 point/items.

The selection of the point/items of the measurement of the velocities of propagation of seismic waves was conducted with the

calculation to study all available for territorin g. of Tashkent the characteristic varieties of ground conditions.

Page 454.

Table 28. Averaged velocities of propagation of seismic waves in the soils, which compose the upper thickness of the territory of Tashkent.

(1) Короткая характеристика грунтов	(2) Скорость волн. м/сек	
	(3) продольных, P	(4) поперечных, S
(5) Мелкоземистый лессовидный суглинок, рыхлый	200—350	100—170
(6) Лесс: сухой	500—900	200—300
обводненный	1000—1600	350—500
(7) Галечник: сухой	1000—1300	300—400
обводненный	2300—2700	500—800
(8) Мергель	1800—2800	600—900

Key: (1). Short characteristic of soils. (2). Wave velocity, m/s. (3). longitudinal. (4). transverse. (5). Silt loess loam, unconsolidated. (6). Loess deposits: dry irrigated. (7). Pebble: dry irrigated. (8). Marl.

Along data of boring, for each point/item, we were arrange/located with the tentative information about the lithologic composition of soils and the level of ground water, which made it possible to compare these information with the results, obtained by seismic method. For checking the reliability of the interpretation of seismic survey data on one of the profiles, is drilled the blowhole (territory CSS "Tashkent").

Based on materials of sepsmorazvedki, are constructed the direct/straight and contrary hodographs of the direct/straight and refracted waves. According to them are calculated the velocities of propagation of vibrations and value t_0 for the layers, which compose the upper 30-40-metric thickness.

From the values of velocities and t_0 were determined the depths of the investigated boundaries from the formula:

$$h_g = \frac{V_g\left(t_g^0 - \sum_{K=0}^{g-1} t_K^0\right)}{2\cos \alpha g_1 g+1},$$

where h_g - they was determined power/thickness g-go the soy-bean: V_g - was determined the velocity in g layer; t_0 is the cut, intercept/detached by continuation g hodograph on the axis of time αg, g + 1 = arc sine $\frac{V_{cp}}{V_{rp}}$; V_{rp} - boundary velocity; V_{cp} - the average speed in that which cover boundary g-is thicker (Gamburtsev, 1959).

As a result of observations from OSU-1, are acquired following data. Surface layers - loams and sandy loams have the minimum speed: V_P = 300-350 m/s, V_S = 157-170 m/s.

Great effect on the velocity of propagation of elastic waves exerts the level of the standing of ground water. Water contaminability considerably increases the wave propagation velocity. Loess rock/species have the velocities: with natural humidity - V_P = 500-900 m/s and V_S = 200-300 m/s, during powerful humidification - V_P= 1200-1600 m/s, V_S = 300-400 m/s.

The values of the velocities in pebbles, which are located above and below the level of ground water, sharply differ from each other: higher than the UGV - V_P = 1000-1300 m/s, V_S = 300 m/s, lower than the UGV V_P = 2300-2700 m/s, V_S = 500-800 m/s.

This property of stone loess deposits is not observed. The uniform layers of loess rock/species detect a gradual increase in the velocity with depth. In the irrigated loess deposits the velocity of the longitudinal P-waves is greater than in dry, and the velocity of transverse S-waves changes insignificantly.

In our observations everywhere is separate/liberated the following regularity: the relation of velocities P- and of S-waves in stone loess deposits comprises γ = 3-4, in pebbles γ = 4-5.

Page 455.

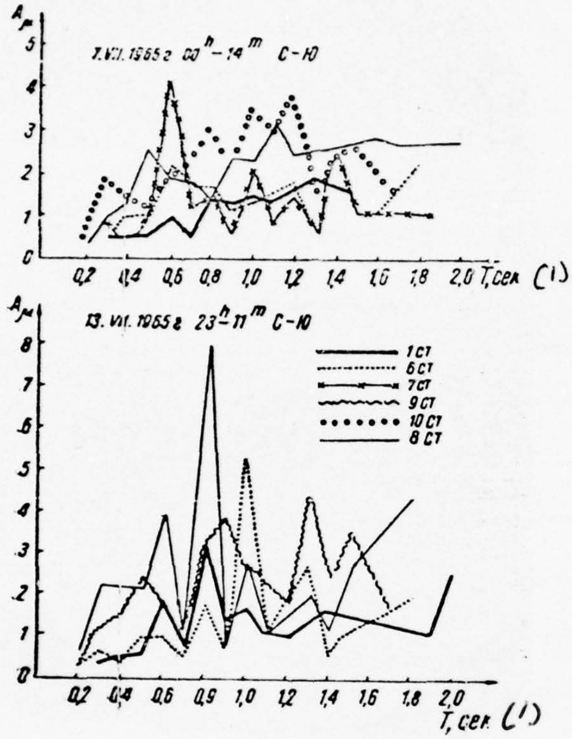

Fig. 207. Oscillation spectra at different seismic stations.

Key: (1) s.

Table 28 gives the averaged velocities of propagation of seismic waves in the soils, which compose the upper thickness of the territory of Tashkent.

The densities of soils, obtained from laboratory data, are given below.

Rock/species.	Density, g/cm³.
Marls.	1.9
Pebble.	1.95
The loess deposits: dry	1.55
irrigated.	1.8

AN ANALYSIS OF RESULTS OF INSTRUMENT/TOOL AND MAKROSEYSMIChESKIKh INVESTIGATIONS.

Seismic effect of earthquakes in city blocks with different ground conditions. For the period from March by 1964 on 1968 urban seismic stations it is recorded 70 earthquakes with different epicentral distances.

The maximum distance between the most moved away observation stations was approximately 15-17 km, which made it possible with a sufficient degree of reliability to differentiate seismic effect and to explain it by the effect of geological engineering conditions, without taking into account correction for a difference in the epicentral distances during close earthquakes. From this viewpoint,

is of interest the analysis of makroseysmicheskikh these two earthquakes - 14-17 March 1965 at epicentral distances with respect to 590 and 50 km.

Page 456.

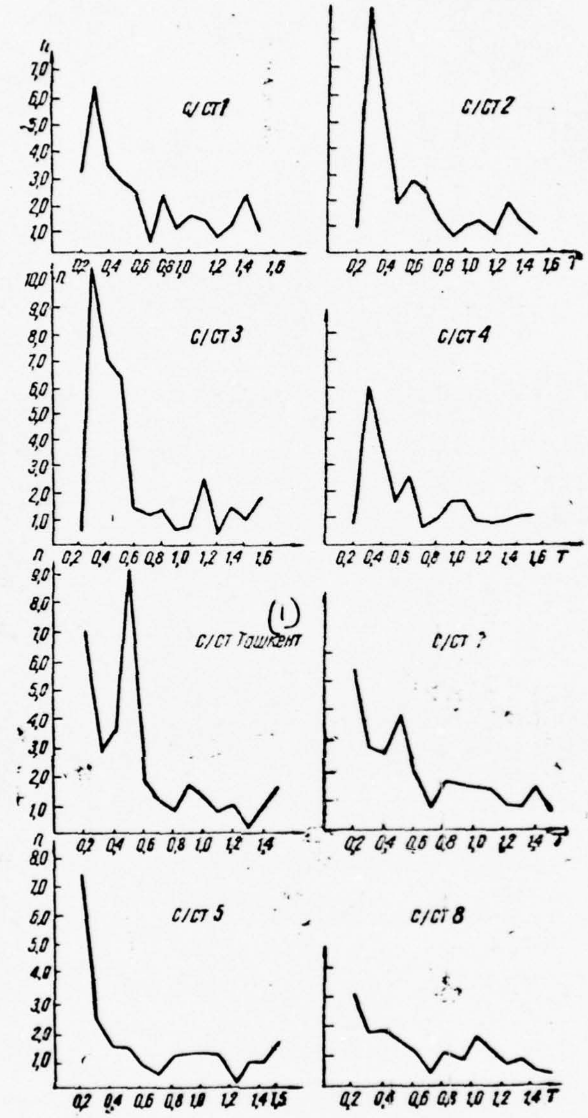

Fig. 208. Curve/graphs of the distribution of the maximums of the amplitudes of shifts depending on period.

Key: (1). Tashkent.

Both earthquakes had approximately one and the same azimuth to epicenters and were revealed in Tashkent on one and the same soils with identical intensity. For example to II nadpoymennoy terrace these earthquakes were perceived siloyu 3 balls, and on IV - 4-5 balls. At the same time the earthquake on 17 March 1965 with epicentral distance 50 km in some regions II terrace was perceived somewhat more powerful than the earthquake on 14 March 1965.

end section.

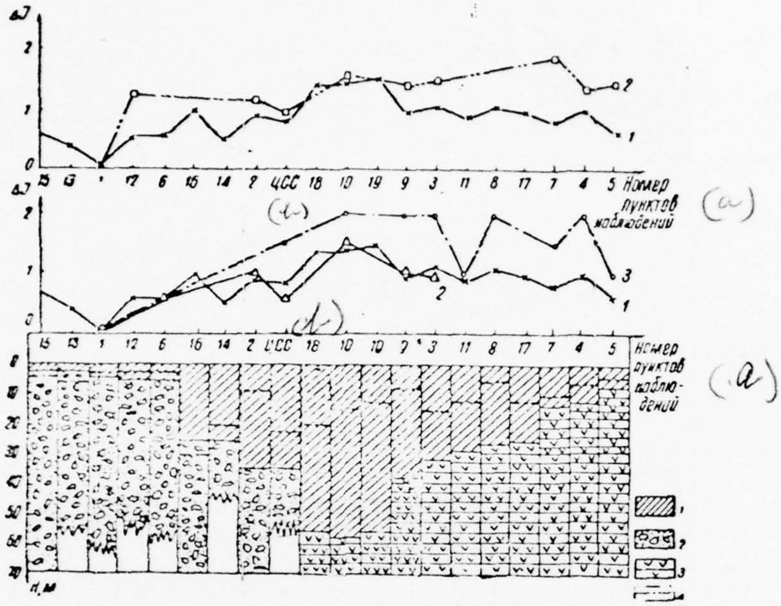

Fig. 2C9. Stratigraphic cut/section under cbservaticn staticns and the curve/graph cf the distributicn cf increases in the intensity in these point/items. 1 - lcess depcsits; 2 - pebble; 3 - marl; 4 - the level cf grcund water. Curved cn 1-m curve/graph; 1 - earthquake with $\Delta \geq$ 50 km; 2 - earthquake with $\Delta \geq$ 50 km. Cn 2-m the curve/graph: 1 - instrument/tool data; 2 - makrcseysmicheskiye data 1946; 3 - the same, 1965.

Key: (a) the number of cbservaticn staticns. (b) CSS.

Thus, 50 km is lower limit for the direct account of the local geological engineering conditions. In connection with this during the treatment of the obtained material the local (0-50 km) and close (≥150 km) earthquakes were examined separately. In quantitative relation they were distributed as follows: close earthquakes - 56, local - 14.

The predominant majority of the epicenters of earthquakes is arranged to southeast from Tashkent, in essence in the region of hindu kush. Part of the epicenters is located around Tashkent.

As a result of the treatment of the materials of close earthquakes, are constructed the curve/graphs of the spectra of displacement (Fig. 207).

As is evident, the spectral curves of the amplitudes of seysmostantsii 1, arrange/located on pebbles, they lie/rest below remaining curves.

Taking into account that the seismic effect on constructions depends not only on the intensity of oscillations, but also on the duration of process, are constructed are curve/graph frequency (Fig. 208).

The curve/graphs, constructed according to the seismograms of seismic stations 1-4 and "Tashkent", have pronounced maximum in the interval of periods 0.3-0.4 s. The arranged/located on south and

south west of Tashkent observation stations 6, 1, 9 and 10 have on one pronounced maximum in period 0.3 s., point/items 7 and "Tashkent" - 2 maximums in periods of 0.2 and on 0.5 s., 5 and 8 - in period 0.2 s. To establish/install any definite dependences of the predominant periods on ground conditions did not manage.

Page 458.

Table 29. Increases in the intensity at different seismic stations.

Номер пунктов наблюдения (1)	Приращения балльности по землетрясениям (2)	
	с Δ>50 км	с Δ<50 км
1	0	0
2	1,0	1,2
3	1,1	1,5
4	0,9	1,3
5	0,4	1,5
6	0,6	—
7	0,6	1,9
8	1,1	1,1
9	1,1	0,9
10	1,4	1,5
11	0,5	1,5
(3) ЦСС	0,7	0,8
12	0,5	
13	0,4	
14	0,5	
15	−0,3	
16	0,0	
17	0,0	
18	0,4	
19	0,5	

Key: (1). Number of observation stations. (2). Increases in the intensity on earthquakes. (3). Ts ~~CSS~~.

For each observation station, was calculated an increase in the intensity according to the formula:

$$\Delta I = 2,8 \lg \frac{A_i}{A_1},$$

where A_i and A_1 it were calculated the maximum amplitudes of the oscillations of the investigated and supporting/reference soils in the interval of periods 0.1-0.6 s. Coefficient in this formula is obtained by calculation on the basis of the analysis of makroseysmicheskikh data of Chatkal'skogo earthquake 3. Nov. 1946.

In this stage of investigations in seismic city planning makroseysmicheskiye data, in spite of their relative subjectivity, must be drawn by the quite wide form. For a territory g. of Tashkent we were arrange/located with sufficiently reliable material on the makroseysmicheskomu examination/inspection of the consequences of the Chatkal'skogo earthquake, which revealed in separate/individual city districs by force more than 7 balls (Churayar, etc., 1949).

Carried out by us the comparison of makroseysmicheskikh data with the results of instrument/tool observations confirmed the conventional now relationship of the intensity of jolts with the maximum amplitudes of oscillations, according to which amplitude change 2 times corresponds on the average to an increase in the intensity into 1 ball.

After the appropriate treatment of materials, are obtained two instrument/tool dependences, which characterize an increase in the

intensity in observation stations for close and local earthquakes (Table 29). During graphing (Fig. 209) observation stations are arranged according to stratigraphic cut/section hearth by them taking into account a change in the power/thickness of loess deposits and character of basement rocks. This cut/section or the average corresponds to the cut/section through Tashkent in direction southeast - northwest.

Dependence curves of an increase in the intensity ΔI, constructed according to close (1) and local (2) earthquakes, on the whole will agree well between themselves. Each dependence they characterize an increase in the seismic effect with advance in northwestern direction. In this case, the values ΔI curve 2 exceed values ΔI curve 1 or more badly will agree with geological engineering conditions. This, apparently, is explained, on one hand, by the more high-frequency composition of oscillations, and on the other hand - by the relative commensurability of the distances between observation stations and the epicentral distances of the origin/hearths of the local earthquakes.

As showed the results of research on the consequences of Tashkent earthquake, strict quantitative analysis of rotations of the local earthquakes is very important during seismic city planning.

All the constructions and the conclusion/derivations which are given below, are based on materials about earthquakes in epicentral 50 km and more distances.

In Fig. 209 are plotted the values of an increase in the intensity according to instrument/tool (is curve I) and makroseysmicheskim data of earthquakes 1946 (is curve 2) and 1965 (is curve 3).

Page 459.

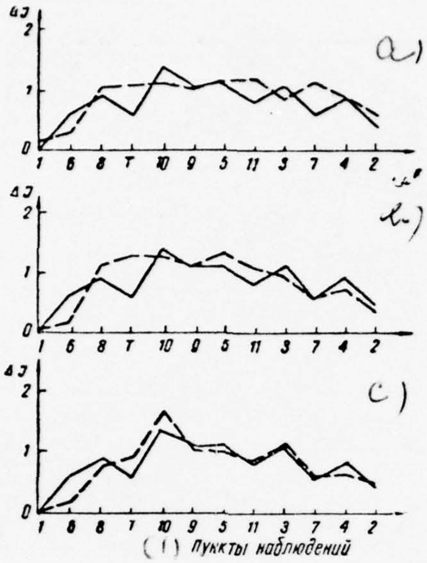

Fig. 210. The comparison of an increase in the intensity on instrument/tool (solid line) and accustic (is broken line) hardnesses for 10 m (a), 30 (b) ever 60 m (c).

Key: (1). Observation stations.

As is evident, the configuration of the curve ΔI of earthquake 1946 better will agree with instrument/tool data than ΔI of earthquake 1965. This is completely understandable, as earthquake 1946 bygone destructive and, as noted above, its intensity in different point/items was determined from more objective sign/criteria - to the destruction of buildings. Earthquakes 1965 were exhibited weakly and the estimation of their intensity it was conducted by means of the oral interrogation of population.

However, in spite of this, both dependences (instrument/tool and makroseysmicheskaya), constructed according to the local earthquakes they have a tendency of a more considerable increase in the intensity.

If we focus attention on stratigraphic cut/section under observation stations and the character of the curves of curve/graph (Fig. 209), then it is possible to draw the conclusion that the change in the power/thickness of the upper loess layer characterizes a change of the intensity in point.

In the period of investigations in seismic city planning of territory g. of Tashkent, is carried out recording the 1000-grand explosion, produced in the spurs of Chatkal'skogo spine/ridge. The analysis of seismographic material shows a good coordination of the distribution of seismic effect in different ground conditions with data, obtained during recording earthquakes.

ESTIMATION OF AN INCREASE IN THE INTENSITY ON DIFFERENT SOILS

ACCORDING TO ACOUSTICAL STIFFNESS.

According to data on the velocities of propagation of seismic waves, by the obtained seismic survey laboratory of PSI-2, and by laboratory data on the densities of soils are calculated increases in the intensity ΔI according to the formula:

$$\Delta I = K \lg \frac{\rho_{cp} \cdot V_{cp}}{\rho_i V_i},$$

where K is calculated proportionality factor. The instruction recommending the accepting of K equal to 1.67, and the power/thickness of the layer for which is calculated the average/mean acoustical stiffness, 10 m.

An increase in the intensity on acoustic measurements was calculated for each point/item where was established/installed seismic station. Average speeds (V_{cp}) and densities (ρ_{cp}) were calculated according to stratigraphic cut/section under seismic stations.

In Fig. 210 dotted lines represented ΔI, calculated from acoustical stiffness taking into account the physical properties of rock/species in the upper layer with a power; H = 10, as recommends instruction; H = 30 as layer, which characterizes the average/mean ground conditions of city; H = 60 as layer, which covers entire thickness of the heterogeneities, which lie on more uniform basis/base.

Page 460.

Table 30. Increases in the intensity, calculated from acoustical stiffness.

(1) Номер станции	$\Delta I = K \cdot \lg \frac{\rho_{cp} \cdot V_{cp}}{\rho_i \cdot V_i}$			$\Delta I_в$ влияние уровня грунт. вод (2)
	H=10 м	H=30 м	H=60 м	
1	0,15	0,05	0	—
6	0,35	0,2	0,2	—
2	1,0	1,1	0,75	—
ЦСС „Ташкент" (3)	1,15	1,25	0,95	—
10	1,1	1,25	1,65	—
9	1,0	1,1	1,05	—
3	1,2	1,25	1,0	—
11	1,2	1,1	0,9	—
8	0,9	0,9	1,14	0,4
7	1,15	0,6	0,65	—
4	1,0	0,7	0,65	0,5
5	0,6	0,6	0,5	—
12	0,5	0,5	0,5	
16	1,2	1,2	1,25	
17	0,5	0,6	0,5	
19	1,5	1,1	1,55	

Key: (1). Number of station. (2). the effect of level the soil. of water. (3). ~~Q~~TsSS, Tashkent.

For the coincidence of the indicated curves with curve AI, obtained from instrument/tool data (solid line), are calculated new coefficients for H = 10 m - K = 1.3; H = 30 m - K = 2.0; H = 60 m - K = 3.0.

Curve AI, constructed in accustical stiffness, in the very best manner coincides with instrument/tool data in the case when is considered entire power/thickness of the upper loess layer, equal to 60 m. In this case, also is emphasized the proportionality of the value of an increase in the intensity of the power/thickness of loess deposits (Table 30). In this case, a supplementary increase in the intensity due to the high level of ground water was accepted into consideration at the height of the standing of water less than 6 m. For irrigation is pebble correction for the level of ground water it was not considered, as according to our investigations, the well condensed pebble virtually does not change elastic properties during irrigation.

Relationship of the estimation of the intensity of seismic oscillations on different soils according to notations of earthquakes, accustical stiffness and MAKROSEYSMICHESKIM data.

As already mentioned, the power/thickness of loess layer with a sufficient degree determines the value of an increase in the seismic intensity. Therefore further investigations are directed toward the search of an increase in the intensity depending on power/thickness relative to unconsolidated deposits.

Figure 211 shows the increases in the intensity, obtained earlier from instrument/tool, accustic and makroseysmicheskim data with an increase in the power/thickness of loess layer. All these dependences in the very best manner are averaged one and the same curved (in figure - solid line), characterizing increase intensity depending on power/thickness is loess under conditions g. of Tashkent.

Page 461.

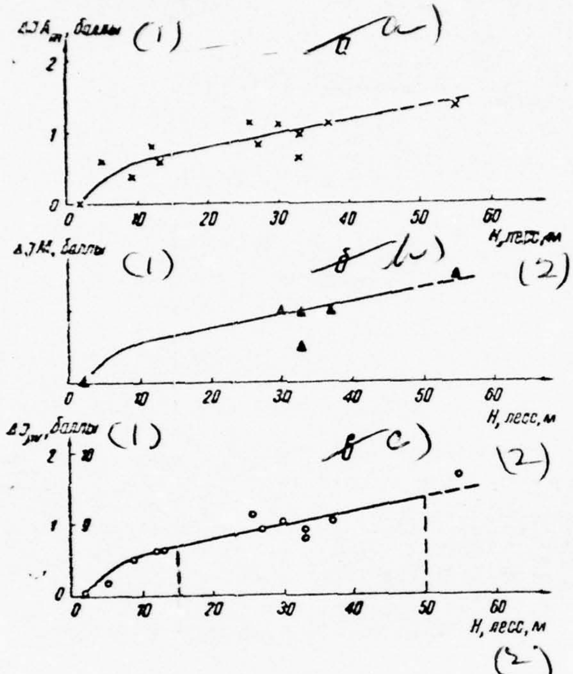

Fig. 211. Increase in the intensity from the power/thickness of loess layer on to instrument/tool (a), makroseysmicheskim 1946 (b) this and acoustical stiffness (c).

Key: (1). balls. (2). loess deposits.

According to the diagram of the seismic division into districts of the territory of the USSR, Tashkent is related to 8-scale-number seismic zone. As the average/mean ground conditions we accepted the sections, composed with pebbles with the high standing of ground water and with the seismicity of 8 balls.

The absolute scale of the values of the quantity of sotryasaemosti (in balls) is plotted/applied to the starboard of the axis of ordinates (Fig. 211). The obtained dependence lay as the basis of seismic city planning of the territory of Tashkent. In this same figure by vertical dotted lines are shown the intervals, in which depending on the power/thickness of loess deposits the force of the maximum jolts differs by one ball.

On the high level of the occurrence of ground water (it is less than 6 m) into the calculations of an increase in the intensity, was introduced supplementary correction. As already mentioned, for the irrigated pebble the correction for ground water was not considered.

Here again it is appropriate to recall that during the construction of correlation dependences were accepted into consideration data, obtained during recording close (nemestnykh) earthquakes. The insufficiency of the available in the period of investigations seismographic and makroseysmicheskogo material on the local earthquakes did not allow us to obtain analogous dependences for small epicentral distances. In all likelihood, and in this case it is possible to reveal/detect/expose the correlations of seismic effect

with the power/thickness of unconsolidated deposits, and, judging by the discovered above tendencies, the approximating curve $\Delta I = f$ (ΔH) will have abrupt/steeper form.

Page 462.

This, in turn, will determine the gradient nature of an increase in the intensity under different ground conditions.

Difficulties during the interpretation of the seismograms of the local earthquakes entail the complexity of the uchityvaniya of the law of the attenuation of seismic waves in sufficiently anisotropic medium in way origin/hearth - seysmostantsiya. In the first approximation, it is possible to consider only the geometric disagreement of the front of elastic wave and approach angles of its to the resounding layer of low speeds. In connection with this we do not eliminate possibility somewhat larger increase in the intensity with the local jerk/impulses.

APPLICATION/USE OF METHODS OF ELECTRICAL PROSPECTING.

As a result of the electrometric investigations by the methods of vertical electrical sounding (VEZ) and of symmetrical elektroprofilirovaniya (SE) with seismic city planning are solved the following problems: the lithologic breakdown of the rock/species of surface deposits and the determination of the depth of the occurrence

of supporting/reference horizon/level (stone loess deposits) and is pebble; the delineation of the zone of propagation is pebble and the establishment of the boundaries between pebbles and loess rock/species; the refinement of the boundaries between II and III nadpoymennymi terraces r of Chirchik within limits g. of Tashkent and in its suburban zone the elaboration of the map/chart of seismic city planning.

Procedure for field studies. For the solution of the indicated problems by electrometric studies is applied the equipment ESK-1 (electronic-pointer compensator). The grid/network of investigations depended on detail and the required accuracy of electrometric investigations.

Vertical electrical sounding (VEZ) was applied for the lithologic breakdown of the rock/species of surface deposits and determination of the depth of the occurrence of the supporting/reference horizon/level of stone loess deposits. Depending on the lithologic structure of region, the grid/network of investigations was 500 x 250 m at the maximum length of the feeding line AB to 500 m, the depth of the studied cut/section at this length of dispersion GET [ПВ] [- ground-elapsed time] was 50-100 m.

Symmetrical elektroprofilirovaniye was applied for the delineation of the zone of propagation was pebble and the establishment of the boundaries between pebbles and loess

rock/species, the refinement of the boundaries between II and III nadpoymennymi terraces r of Chirchik.

Works were fulfilled through separate/individual to profiles by diagram AMNB and AM' N' B'B (A'B' = 30 m, AB = 60 m). The distance between profiles it was from 100 to 300 m, the step/pitch of observations (l) was equal to 10-20 m.

Results of vertical electrical sounding (VEZ).

As a result of the quantitative and qualitative interpretations of data of VEZ, established/installed that within the limits of the studied territory are separate/liberated the individual sections, which differ in terms of electrical properties, which indicates a change in the geological-geomorphological conditions.

Within the limits of the indicated area, are separate/liberated the following sections: composed from surface by loess covering, that are laid by stone loess deposits and pebbles; composed from surface by small loess covering on the order of 3-10 m and being laid by great thickness of pebble deposits.

Page 463.

To the first section they are related the northeastern and northern part of the studied territory where are developed the

prolyuvial'rye deposits Tashkent, $(p!Q_2^t)$ and the alluvial deposits goldnostepskogo complexes $(a!Q_{III}^{gl})$. Geomorphologically they are related to IV and III nadpoymennym terraces r of Chirchik.

The fourth nadpoymennaya terrace is accumulated by the loess rock/species of Tashkent complex (Q_2^1) and it occupies about 70o/o of entire territory of city.

Deposits IV nadpoymennoy terrace are cut through by the erosive vrezami of the dolinc-girder grid/network (Bozsu, Karakamysh, Salar, Chauli, etc.) of goldnostepskogo cycle $(Q_{III}^{g1}$, with a power 10-12 m.

The deposits of Tashkent complex are also developed in valley r Chirchik. where they compose III nadpoymennuju terrace which in larger part is washed away and on surface is outlined by narrow intermittent band. In lower part this terrace is accumulated by the pebbles of the average/mean size with a power ~~1-12~~ 10-12 m. The upper part is represented by loess rock/species with a power 3-10 m.

To the second section are related the areas of the propagation of deposits II and I nadpoymennykh terraces r of the Chirchik, presented by the alluvial rock/species of syrdar'inskogo complex $(Q_{IV}^{sd}$ - krupnovalunnymi pebbles with a power 20 m, by the covered melkozemami (sands, loams with the well developed root system). The power/thickness of silt deposits within limits II nadpoymennoyy of terrace are 0-4.5 m, within limits of I - 0 - 1 - 3 m.

The basic volume of vertical electrical scundings is executed within the limits of the 1st section where are arranged the masses of building the north-east, the north, Karakamysh. The regional profile of I-I, passed within the limits of this section and which covers the masses of building the north-east, north and Karakamysh, passes in direction from northeast to west from SKV [- blast hole]. "Yalangach", arrange/located within limits tc-for im. Lenin Kalinin region, i-d. the stage of Shumilova, northern part of the mass of Karakamysh, olympic town and SKV "is vegetable-growing", arrange/located into withn-ze "Tashkent" of Kalinin region.

The second regional profile of II-II also stretches from northeast to west, restricts the masses pointed cut above from south side and passes from the blowholes of "Yalangach", the "park/fleet of conquest", "Sabir Rahimov TashZriiEE" and "vegetable-growing". As a result kchestvennoy and quantitative interpretation of the curves of vertical electrical sounding, established/installed that the geoelectric cut/section on this section is characterized by the type of curves KQ; QQHK; HKQ, the most widely accepted into predelkh masses north-eastern and northern, where are developed deposits IV terrace r of Chirchik.

The geological cut/section on this part of the section is characterized by the shallow occurrence stone is loess (supporting/reference horizon/level), overlapped from surface by loess

deposits with a power 0-25 m. In certain cases between loess deposits and stone loess deposits are encountered the lenses of sand-gravel-pebble deposits thickness from 0.5 to 4-5 m.

Resistivity supporting/reference horizon/level oscillates within limits of 10-12-20-35 ohm. m, depending on the content of the current-conducting concretions, and also the water contaminability of these deposits. In the curves of vertical electrical sounding, this horizon/level is noted by a reduction in the resistivity and by the outcrop of the final branch of the curve to low values (Fig. 212).

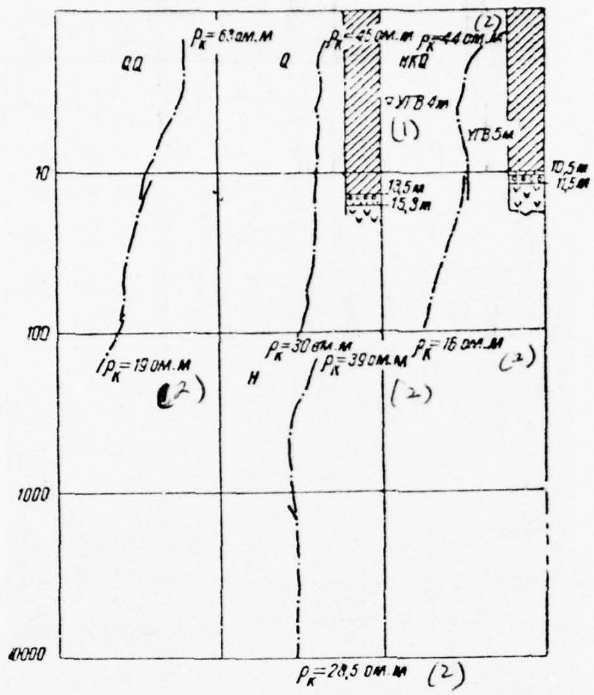

Fig. 212. Characteristic curves VÉZ for III, IV nadpoymennykh terraces r of Chirchik.

Key: (1). UGV. (2) Ω•m.

When in the geological cut/section between loess deposits and stone loess deposits is encountered the lens (power/thickness 1-3-5 m) of sand-gravel deposits, the curve of vertical electrical sounding it has form HKQ.

As a rule, within the limits of the investigated depth (to 50 m) the water-containing rock/species are the sand-gravel-pebble deposits. When the lens of these deposits reaches large thickness (3-5 m and more) with the predominance in them of clay particles, the curve of vertical electrical sounding has form HKQ.

In the case of the absence of the lenses of sand-gravel-pebble deposits, the curve of vertical electrical sounding has a form of the type "H "with the outcrop of the final branch of the curve to true resistance (Fig. 212). The form of the curves of vertical electrical sounding the type "Q "; QQ; KQ, that predominates in the northeastern and northern parts of the territory, is alternated in western and southeasterly directions with the form of the curves HK and HKQ, which is explained by an increase in the depth of the occurrence stone is loess in this direction, whereas in the regions of TashGRESa and Yunusabada they emerge to surface or will lie closely it.

The power/thickness of loess rock/species or profile of I-I begins to increase in northwestern part the sett. of Yunusabad (12-18 m) and reaches the greatest (to 60 m) power/thickness in the northwestern part of the mass of "Karakamysh".

Page 465.

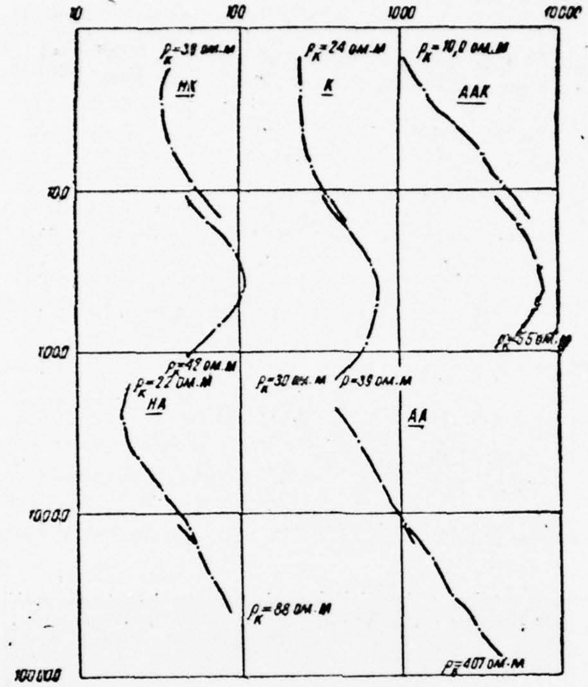

Fig. 213. Characteristic curves V3Z for I and II nadpoymennykh terraces r of Chirchik.

Key: (1) Ω•m.

North, northwest g. of Tashkent (Stud. town, the park/fleet im. A. Nabiyeva) are characterized by the maximum power/thickness of loess deposits (on the order of 80 m in the region of the institute of TashZNiiEP). From Stud. town to west, is noted a gradual decrease in the power/thickness of loess rock/species to 25 m (region SKV "vegetable-growing").

According to data of other researchers, the power/thickness of loess deposits in the northwestern part of the city is characterized by smooth change from 25 to 36 m. The resistivity of these rock/species varies into predelkh 15-100 Ω/m. The maximum power/thickness of loess deposits reaches 36-38 m.

On the profiles, assigned in northwestern - southeasterly directions the Cretaceous deposits, presented by loams, sandy loams with the water-containing lenses is pebble and sandstone, they have specific resistance 10-100 Ω/m. The depth of supporting/reference horizon/level (N_2 + Q) is 20-60 m.

The south part of the investigated region is related to II to terrace r of Chirchik and differs in terms of the higher values of resistivity. The curves of vertical electrical sounding have a form of the type "K "; HK; AAK; A; AA; AK (Fig. 213).

the boulder-pebble deposits, distributed in II nadpoymennoy terrace r of Chirchik, depending on the size/dimensions of pebbles, their stsementirovannosti and water contaminability have the different

resistance, which vary from 100 to 2000-3000 Ω/m.

Page 466.

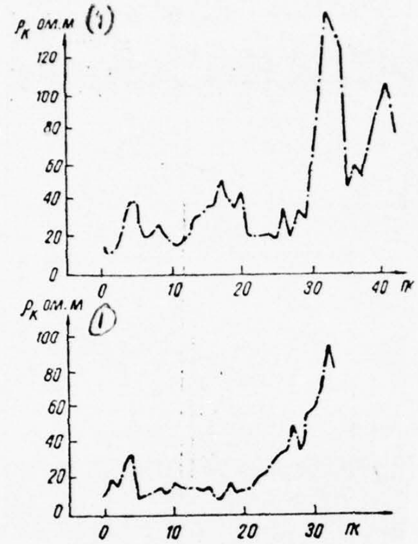

Fig. 214. Curve/graphs of the impedance of symmetrical elektroprofilirovaniya on diagram AMNB (AB = 22 m, Mn = 10 m).

Key: (1). Ω.m.

RESULTS OF SYMMETRICAL ELECTRICAL PROFILING.

By prerequisite/premise for refining the boundaries between II and III nadpoymennymi terraces r of Chirchik within limits g. of Tashkent and its neighborhoods as the method of symmetrical elektroprofilirovaniya by diagram AMNB and AA'MNB'B served the difference in the resistivity of the rock/species, composing these terraces. So, the specific resistance of boulder-pebble deposits II nadpoymennoy terrace, as noted above, 100-2000-3000 Ω/m, whereas loess deposits III nadpoymennoy terrace r of Chirchik - on the order of 20-80 Ω/m.

On the curve/graphs of the apparent electrical resistance, constructed according to data of symmetrical elektroprofilirovaniya (Fig. 214) it is apparent that the interface between II and III nadpoymennymi terraces clearly is repulsed on specific resistances. Thus, are studied the electrical properties of the surface deposits of the region of investigation, established/installed a change of the resistivity depending on geological, geomorfologicheskikh, hydrogeological conditions.

The materials of electrical prospecting rendered great aid during the refinement of the boundaries of different seismicity.

Map/chart of seismic city planning of territory g. of Tashkent and its suburban zone.

As the basis mappings of seismic city planning of Tashkent on close

earthquakes lay the following positions: the power/thickness of loess layer increases the intensity of the manifestation of earthquake in city blocks; the 8-scale-number zone includes the sections, composed by loess deposits with a power to 5 m; to 9-scale-number - composed by loess deposits with a power from 5 to 60 m.; with the occurrence of the level of ground water above 6 m the intensity depending on the power/thickness of loess layer additionally is added one ball; the irrigation of the well condensed pebble does not affect seismic effect.

Taking into account the positions enumerated above are contoured the sections with the high standing of ground water and is with a power loess from 0 to 5 m, from 15 to 60 m.

The isolation technique of these zones entails the following. The map/chart of the territory of city is broken into squares 1 x 1 km.

Page 467.

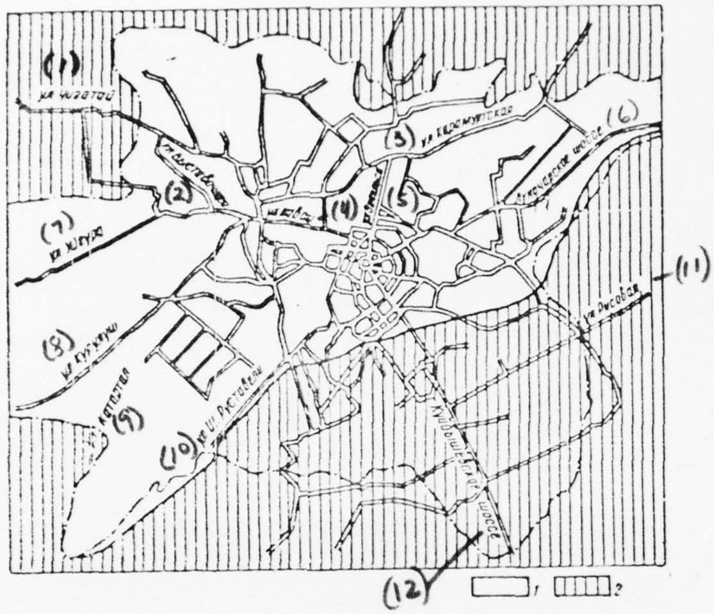

Fig. 215. Map/chart of seismic city planning of territory g. of Tashkent and its suburban zone. 1 - zone by the seismicity of 9 balls; 2 - 8 balls.

Keys: (1) - (12) illegible.

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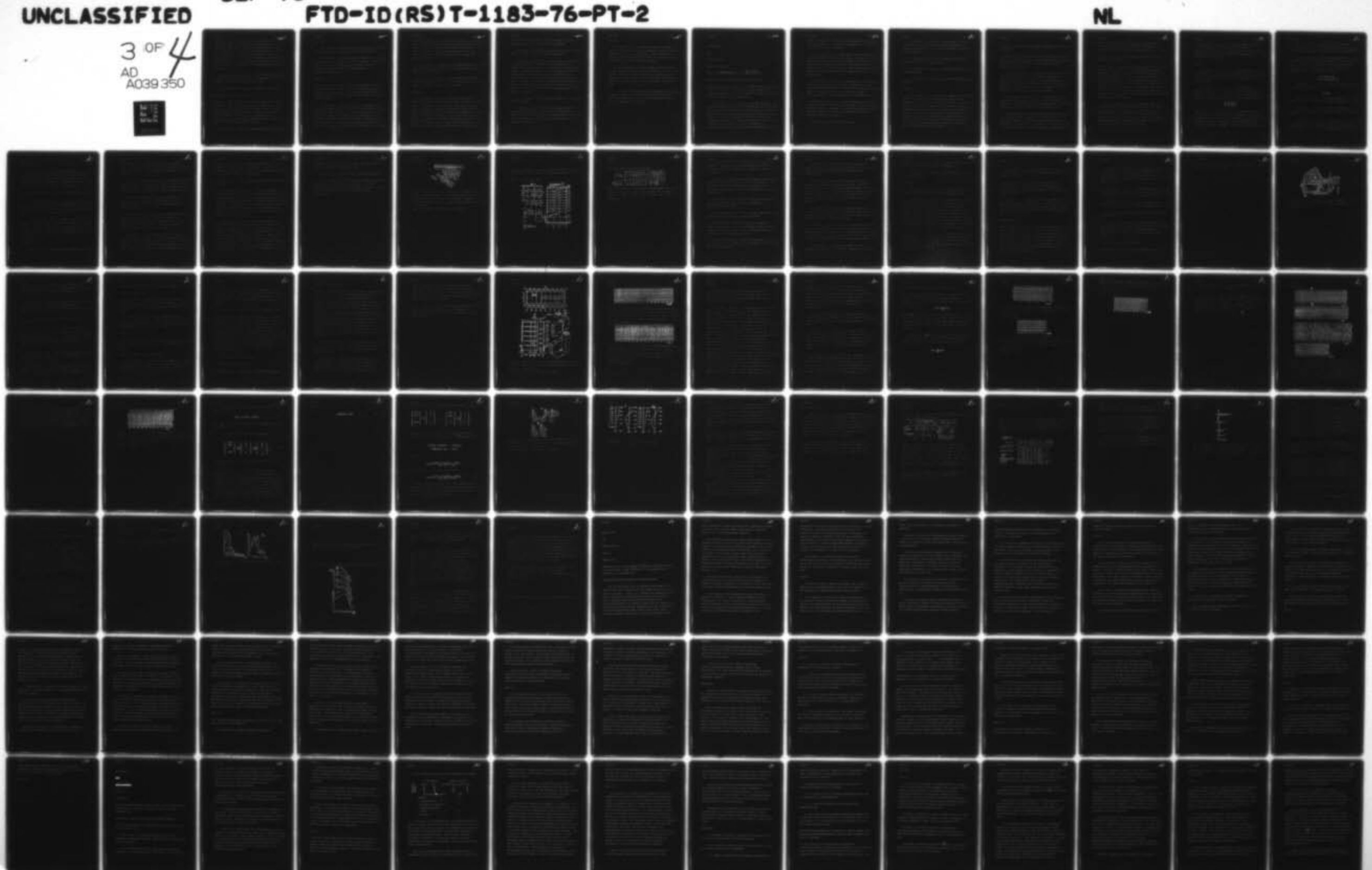

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Then to each square of this map/chart are plotted/applied: on lithologic map/chart - the boundary of transient sections; on the map/chart of gidroizogips - sections with the high level of ground water; according to the descriptions of blowholes (their it is more than 300-400), as far as possible and necessarily - data on the power/thicknesses of loess layer and the level of ground water; on the available geological cut/sections along and across the territory of city - data on the power/thicknesses of loess layer and the level of ground water.

According to these materials are isolated the zones of different seismicity (8 and 9 balls), is comprised the map/chart of seismic city planning of territory g. of Tashkent (Fig. 215).

Are described below the band edges of different seismicity.

Zones by the seismicity of 8 balls.

Territory I (completely) even II (partially) nadpoymennykh terraces r of Chirchik. Band edge by seismicity 8 and 9 balls in this region passes (from northeast to south west) through the are. Karasu with current downward, terminal area, then emerges to the intersection of Sh. Rustavelli's streets and Mukimi and continues on st. Sh. Rustavelli to intersection with the boundary of city. Total area of zones by the seismicity of 8 balls - 77 km².

Entire remaining territory is related to zone by the seismicity

of 9 balls.

Thus, within the limits of city are separate/liberated two region where the intensity of jolts can reach by 8-mi. and 9 balls.

Data, obtained when conducting works or seismic city planning, characterize only the relative picture of the possible seismic effect, an inaccuracy in the determination grand average intensity of territory it lowers the quality of investigations in seysmomikrorayonirovaniyu.

Page 468.

So, according to the map/chart of seismic division into districts sufficiently schematically to one zone or the other is assigned the possible seismic effect during the most powerful earthquakes in the studied region. Estimation is related to the so-called average/mean ground conditions.

To say nothing of about the fact that the insignificant time interval of observations and the absence of the reliable procedure for the development/detection of the potential danger of seismic zones do not make it possible to confidently district territory, the very ill-defined determination of the average/mean ground conditions and the difficulty of their isolation concrete/specific/actual areas it affects the authenticity of the absolute estimations of intensity with

seismic city planning. So, if g. Tashkent occupied the territory of pebble deposits r of Chirchik, then pebble also automatically would be accepted as the average/mean ground conditions and precisely to it bygone it is ascribed 8 balls, the remaining part of the city - 9 balls. This occurred during the analysis of the seismic effect of the Tashkent earthquake.

With the use by the map/chart of seysmomikrorayonirovaniya, it is not required to introduce supplementary corrections for intensity because of ground conditions.

On the basis of research on seysmotektonicheskikh conditions g. of Tashkent, is isolated the section of the ellipsoid form where the habitable building is assumed to be to restrict.

Conclusions.

Investigations in seismic city planning of the cities of uzbekistan are carried out for the first time. As starting materials with the determination of the correlation dependences of seismic effect on geological engineering conditions, are drawn lithologic, hydrogeological, acoustic, seysmometricheskiye and makroseysmicheskiye data. Is examined the seismicity of the adjacent seysmoaktivnykh zones and is determined a maximally powerful seismic effect, possible in the territory g. of Tashkent during powerful earthquakes in these zones. As a result established/installed that the maximum jolts

correspond to sections with the large power/thickness of loess deposits, minimum - to pebble deposits r of Chirchik.

The complex of investigations conducted in seismic city planning makes it possible to make the following conclusions.

1. The value of seismic effect increases with a power increase of loess layer, which is connected with the phenomenon of the reverberation of seismic waves in the layers of the lowered/reduced velocity depending on the power of loess rock/species and length of seismic waves. In connection with this is recommended with seysmomikrorayonirovanii on accustical stiffness under analogous ground conditions to accept during calculations into consideration the layer, which includes entire power/thickness of loess deposits. An increase in the intensity depending on the power/thickness of surface layer is not linear.

2. The irrigation of the well condensed pebble does not show up in seismic effect.

3. With seismic city planning under conditions, similar to Tashkent, the coefficients in expressions for the calculation of an increase in the intensity according to seysmometricheskim and accustic data it is necessary to undertake others how are assumed to be in spetsial"noy literature.

Page 469.

4. Recording and the treatment the notations of industrial explosion showed that the effect of explosions on different soils was similar with the effect of earthquakes. In the regions where are absent frequent earthquakes, it is possible with confidence to apply the notations of explosions for city planning.

5. The determination of the correlation dependences between seismic effect and geological engineering data in the limits of city and the analysis of the ground conditions in suburban area make rational the composition of the diagram of seismic city planning in considerable territory, without being restricted to the boundary of city.

6. With seismic city planning of the territory of city and large objects of industrial and civil building along with geological engineering investigations it is extremely necessary thoroughly to study the seysmogennost' of region.

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Page 600. Chapter VI

Engineering-~~seismometriceska4~~ seismometric service ~~of~~ of the city of Tashkent.

ORGANIZATION OF ENGINEERING-SEISMOMETRICESKO1 SERVICE.

In view of the wide spread/scope of the housing-civil and industrial construction in regions with the large seismic activity before designers and builders, is placed the problem - to ensure the seismic stability of buildings and constructions.

The complexity of the solution of this problem entails the fact that almost completely there is no information about the real behavior of buildings and constructions during seismic effects. For obtaining this material, according to the resolution of the GKSM of the USSR on science and engineering, the GKSM of the USSR on the matters of building and presidium of the AS USSR "of the further development of scientific research works in the region of seismology and earthquake-proof building and improvement in the organization of these

works" in our country is created the expanded/scanned grid/network of point/items according to instrument/tool observation of the behavior of constructions during earthquakes.

Great significance in the grid/network of such point/items has engineering-seismometriceska4 service (ISS) g. of Tashkent. This is caused by the fact that after April earthquake in city constructed are constructed the contemporary buildings on all standard projects, accepted in the USSR. In city are raised also unique buildings by the height of 17-19 floor/stages, which is realized for the first time in Central Asia.

The organization of engineering-seismometriceskol grid/network g. of Tashkent is charged to the institute of mechanics and seismic stability of the constructions of the A.S. of the Uzb.SSR, in which is bygone is created at the end 1966 laboratory of engineering seismology, which is directly occupied by the organization of ISS.

Territory g. of Tashkent is arranged on sections with different geological engineering conditions, and therefore as the basis the ISS of city is placed the principle of recording the behavior of uniform and diverse buildings on sections with different and identical geological engineering conditions.

Before ISS are placed the following tasks.

1. Accumulation of actual data on the behavior of buildings and constructions during earthquakes for further development and the perfection/improvements of the methods of calculation of buildings for seismic stability.

2. Development of the methods of forecasting the possible development of dangerous seismic strains.

3. Evaluation of the effects of ground conditions under the seismic influences.

4. Selection of the optimum design concepts of earthquake-proof buildings.

Page 601.

For the solution of these problems, is developed the preliminary procedure for recording the oscillations of buildings during earthquakes, which includes the following questions: the selection of the place of location and optimum number of points of recording the oscillations of buildings; the determination of the necessary for recording kinematic value (displacement, velocity, acceleration); the determination of the necessary quantity of seismic equipment for recording oscillations and its type determination; the character of the treatment of seysmometricheskogo material for obtaining the necessary dynamic parameters of buildings.

LOCATIONS AND OPTIMUM NUMBER OF POINTS OF RECORDING THE OSCILLATIONS OF BUILDINGS.

The question of the selection of the places of location and quantity of points of recording must be solved in each concrete/specific/actual case depending on height and type of the building, underlying equipment seysmoapparaturoy.

During the development of the procedure for organization, the ISS established/installed that for the confident determination of the first form of the natural oscillations of constructions, in our opinion, it is necessary, to arrange the minimum 4 points along one vertical axis of the building: during the overlaps of the upper, intermediate and first floor/stages and in basement.

In plan/layout all sensors must be arrange/located as far as possible on the intersection of the central axes of building for the avoidance of the distortion of the forward/progressive oscillations of building with its rotary oscillations in horizontal plane.

For the comparison of the oscillations of soil and building, it is necessary to organize ground point at a distance 20-30 m of the investigated building. In order to exclude the superposition of the oscillations of building on the oscillations of soil, this point must be arrange/located far from other construction. Seysmoapparatura at

points is establish/installed so that with its aid would be record/written the horizontal oscillations of building in the direction of the longitudinal and transverse axes, and also vertical.

Selection of the kinematic cell/elements of motion for a notation and equipment, used with ISS.

At present there is no large factual material, which makes it possible with sufficient accuracy to determine, which of the kinematic parameters of motion - displacement, velocity or acceleration more preferable to record at ISS. During recording each of them, are their positive and disadvantages. Therefore during the first stage of the organization of ISS, in view of the absence of the experiment of this service, apparently, it is expedient to produce recording all three parameters of motion - displacement, velocities and acceleration. In accordance with this at the stations of ISS, must be the seismographs, velosilografy and accelerographs.

The basic requirement, imposed for equipment, which follows: seysmoapparatura must receive and record with small distortions of oscillations, excited by earthquakes by force from e-x to 9-balls. In accordance with this by the stations of ISS, is accepted the galvanometric method of recording, characterized by simplicity and sufficient reliability, by clarity and comparatively low requirements for the qualification of the service personnel.

The principle of galvanometric recording entails the fact that the displacement/movement of the mass of the pendulum of electrodynamic sensor causes the appearance of the electric currents which are recorded with the aid of the mirror galvanometer of svetoluchevogo oscillograph.

Page 602.

Thus, during galvanometric recording under seismograph is implied the assembly of the instruments: seismic receiver - the communication channel of communication is a galvanometer - oscillograph - cassette with photo-paper.

At present most is widely common the measurement of the displacement of object. The equipment, which records displacement, makes it possible to attain high sensitivity. To this equipment are presented the requirements, expressed by the following relationships:

$$T_1 \gg T_2;\ T_1 < T_w$$
$$D_2 \gg D_1;\ D_1 < 1,$$

where T_1 they is presented the period of the natural oscillations of the pendulum of seismometer, T_2 they is presented the period of the oscillations of the framework of galvanometer; D_1 - decay constant of the pendulum of seismic receiver; D_2 is decay constant of the framework of galvanometer; T_ω - the period of recorded oscillations.

Thus, are necessary the following systems of instruments: V3GIK-GILBERT-III, with-cShch-with-gilbert-III, VBP-CIII-GILBERT-III and, etc in the appropriate for each pair range of periods $T_w^{min} - T_w^{max}$.

The most stable value at the notation weak and average earthquake intensity with constructions is the velocity. For the more correct notation of velocity, is necessary satisfaction of the following conditions when using systems of instruments K-001-M 001.2; V3GIK-GILBERT-the IV; S-5-S-M 001.2 and the, etc:

$$T_1 \gg T_w^{max};\ T_2 \ll T_w^{min};$$
$$0{,}3 \leqslant D_1 \leqslant 0{,}4;\ 0{,}3 \leqslant D_2 \leqslant 0{,}5.$$

Finally, for the notation of acceleration necessary to fulfill the following relationship:

$$T_1 \ll T_w^{min}.$$

Most let us use here the accelerograph, comprised of the seismic receiver of SPM-16 and overdamped integrating galvanometer of GB-III.

The notation of earthquakes is conducted to oscillograph photo-paper of svetoluchevykh oscillographs N-700, of POB-12, N-004, N-010.

Oscillographs are multichannel. Their mechanism is driven by the electric motor of direct current. Power supply is realized from storage batteries or the network of alternating current with the aid

of rectifiers.

In all oscillographs there is an internal otmechik of time. In this case, the time between the beginning of motion and the normal rate of the drawing of photographic film in oscillograph must not exceed 0.1-0.2 s., and the duration of rotation must be order 60 s. at the rate of the drawing of paper not less than 10 mm/s.

Oscillations one should record with period from 0.05 to 1.5-2.0 s.

For the synchronization of rotations with several oscillographs to internal marker, connect the switch clocks, which each second will deposit to vibrogram special marks with the aid of the supplementary galvanometers, connected in parallel to each other.

In connection with the fact that previously unknown time of the arrival of seismic disturbance/perturbation, equipment for recording is located in the so-called "waiting" mode/conditions, i.e., it is included with the aid of special automatic starter only in the torque/moment of the arrival of seismic wave with the loss of the first arrival.

Page 603.

With the simultaneous development of the network of engineering-

seismic service in institute, are conducted the investigations according to the procedure for the treatment of the obtained notations of the oscillations of buildings during the earthquakes of different intensity.

Besides svetoluchevykh oscillographs, are recently widely common engineering-seismic oscillographs of the type of ISO-II. Notation is conducted to usual photographic film 35 mm wide. Oscillograph is equipped by autonomous starter from the signal of seismic receiver.

Besides the seismometers of galvanometric recording, at the stations of ISS it is expedient to apply automatic unit UAR-M for a simultaneous notation e-x of the components of acceleration in powerful earthquakes.

One should also note mnogomayatnikovyy seismometer the AIS-3M, which obtained wide acceptance. AIS-3M is intended for the direct/straight determination of the spectra of action and given seismic acceleration of powerful and destructive earthquakes, beginning approximately with e-x - I-x of balls.

The first stage of the organization of ISS g. of Tashkent provides for creation six-seven of the strong points of engineering-seismometriceskoi service, arrange/located in different regions g. of Tashkent and which are distinguished by their geological engineering data: strong point No 1 - the region of Tekstil'kombinata; strong

point No 2 - the region of Academgorodok; strong point No 3 - the region of the block of C-4; strong point No 4 - the region of the zhilgorodka of TashGRES; the strong point of zhilmassiva rice; strong point No 6 - the region of university town.

First supporting station of engineering-seismometriceskoi service in Tashkent.

The described station is organized in 1968 in the 9-graduated frame-and-panel habitable building, arrange/located in the region of Tekstil'kombinata. In the limits of supporting station, are located the following buildings: tower type 9-graduated frame-and-panel house with cafe; the shch-graduated brick house of the series of I-310-I; 4 is located the graduated brick house of series 1-310-24; the I-graduated large-panel house of series to Kamyu (I-464); several 2-graduated brick houses (Fig. 251).

Characteristic of object. The framework of building is the monolithic reinforced concrete framework/body. In plan/layout 9-graduated building (without cafe) has size/dimensions 18 x 18 m, the height of each floor/stage 2.70 m, of basement location - 5.62 m. Overall height of the level of the Earth 31.70 m. Overlap from the composite multicone slabs, resting on the cross bars of frames and monolithizedd with assembly. By the external enclosing constructions of building and staircase are the keramzit-concrete panels 25 cm. thickness which are fastened with the aid of the welding of issues and

mortgage parts with the cross bars of frame. Internal baffles are made from gipsobetona and brick (Fig. 252).

Basement is a continuous reinforced concrete plate/platform.

With the station of ISS, are recorded the kinematic cell/elements of the motion: displacement and acceleration. engineering-seismometriceska4 network includes the network of the points at which are placed the seismic receivers, registration complex, communications.

Page 604.

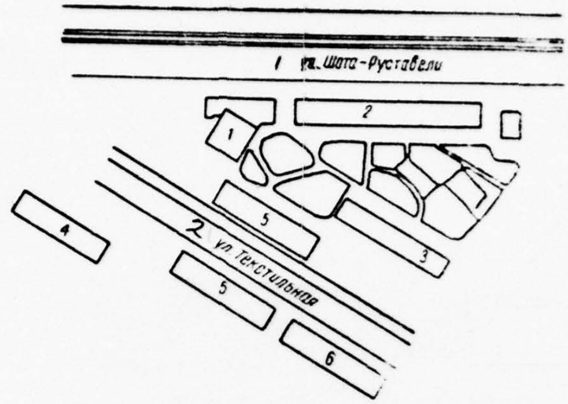

Fig. 251. General plan of strong point No 1. 1 - tower type 9-graduated habitable house; 2 - 72-apartment habitable house ser. 310; 3 - 48-apartment habitable house ser. 1-310-24; 4 - I-graduated large-panel habitable house; 5 - 2-graduated brick habitable houses; 6 - is barbershop.

Key: (1) st. wota-Rustavelli. (2) st. is textile.

Fig. 252. Plan/layout for standard floor/stage (a), the cut/section of 9-graduated building (b), the fastening of external wall panels (c).

Key: (1). Assembly is loop.

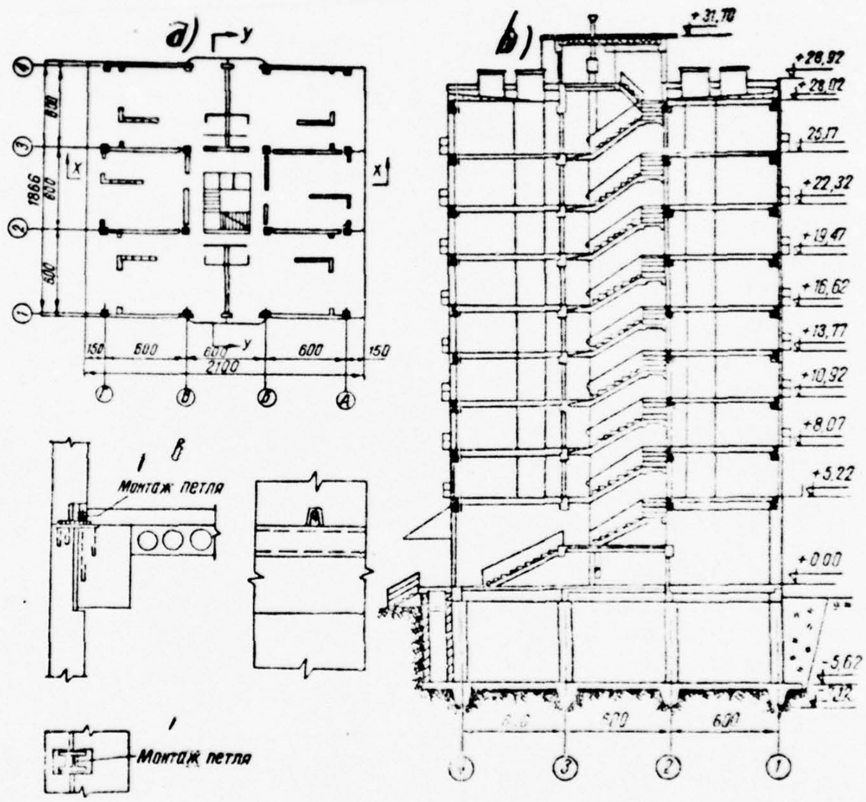

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Table 49. Dyramic parameters ct buildirg.

1 Способ возбуждений колебаний	2 Результаты, полученные экспедицией				3 Результаты, полученные на постоян. ст. ИСС			
	4 периоды				4 периоды			
	T^{I}_{xx}	T^{I}_{yy}	T^{II}_{xx}	T^{II}_{yy}	T^{I}_{xx}	T^{I}_{yy}	T^{II}_{xx}	T^{II}_{yy}
5 Микросейсмы	—	—	0,27	0,23	0,626	0,48	—	—
6 Раскачивание	0,86	0,66	—	—	0,63	0,48	—	—
7 Землетрясение	0,86	0,66	0,27	0,23	0,7	0,55	—	—

Key: (1). Method of the excitaticns cf oscillaticns. (2). Results, cttained by expediticn. (3). Results, cttainec cn postoyar. the stage cf ISS. (4). pericds. (5). Micrcseism. (6). Swaying. (7). Earthquake.

The seismic detectors are arrange/located at 6 points on the overlaps of floor/stages along the vertical axis of building and at ground point in seismic bunker, which is located at a distance 18.5 m of building.

At points are established/installed the metallic boxes, rigidly sealed in overlaps in which it is located seismic equipment for the notation of horizontal oscillations in the directions of the longitudinal and transverse axes of building, while in e-x points - in vertical axis.

In accordance with stated problem for recording displacement at the station of ISS, is used the system of instruments with-cShch-with-gilbert-III.

The seismic receivers of S-5-S are connected across shunts to the galvanometers of the GB-III of oscillographs N-700.

For recording acceleration at station, are utilized the accelerographs, comprised of the high-frequency seismic receiver of SPM-16, connected across shunts to the integrating galvanometers of the GB-III of the oscillograph of N-700.

Besides instruments with galvanometric recording, at the station of ISS ground point is equipped with the seismometers of AIS-3M, MSN-G and coal cutting machine.

Registration location arranged in the base floor/stage of building serves for the arrangement/permutation of the recording and accessories (control panel, battery section, shelves with oscillographs).

As noted above, observation of the behavior of building is conducted by galvanometric recording, which makes it possible to record/write the behavior of buildings during earthquake over a wide range of frequencies and to regulate instrument sensitivity within the necessary limits. For this on the panel of control increase are assembled the shunts, connected with switch with the assigned increase.

The notation of the oscillation of building is conducted on by svetoluchevom the oscillograph of the N-700 whose power supply is realized from storage batteries 5KN-60 (or from common/general/total network), the connected with rectifier VSA-6a.

Registering apparatus is located in the waiting mode/conditions. Entire system is switched on in the torque/moment of earthquake automatically from the starter of the engineering-seismic oscillograph of ISO-II with the starting/launching sensor of S-5-S, arrange/located in seismic bunker, which provides recording earthquake during 60 s.

In oscillographs are established/installed the supplementary galvanometers, connected in parallel into diagram with the maritime

chronometer of the 60-MX PER SECOND, on bursts of which is conducted the synchronization of the obtained oscillograms.

Recording systems are switched on from earthquakes by the force of 3 balls and above.

Page 606.

The communications of ISS include the cable lines, employed for communication/connection of points with registration complex.

In period from 15 August through 10 September 1966 in this region the institute of seismological building and seismology the A.S. of TadzhSSR together with the institute of mechanics and seismic stability of the constructions of the A.S. of the Uzb.SSR organized seysmometricheskaya station for recording the behavior of building with the aftershocks of Tashkent earthquake. As a result is written several earthquakes, including one aftershock of Tashkent earthquake by the force of 4-5 balls even one Afghan earthquake of the same force (" building and the architecture of uzbekistan", No 4, 1967).

From time of the organization of the constant station of ISS in this building, was possible to write two earthquakes, which occurred in Afghanistan 5 Mar. 1969 by force of 4-5 balls and in Tashkent 13 May 1969 force of 3-4 balls (in all cases the intensity was determined by seismic station "Tashkent").

The measurement of the dynamic characteristics of building was conducted also by other methods of the excitation of oscillations (microseism, swaying).

It is interesting to note that the dynamic parameters of building, determined at the constant station of ISS, differ significantly from the parameters, determined in the operating cycle of expedition (Table 49).

A difference in the periods of the natural oscillations of buildings, apparently, is explained by the fact that in the operating cycle of expedition building building still not is bygone completed. Obtained actual data on this building are of large interest and will be minutely are examined.

Academgorodok.

In the region of Academgorodok g. of Tashkent, are constructed and are located in stage buildings of the building of the institutes of the A.S. of the Uzb.SSR contemporary construction. Among other things in the process of the completion of building, is located the new building of the institute of mechanics and seismic stability of constructions, which is assumed to be to equip by seismic equipment in 1970. The building is arrange/located hereabout from the intersection of streets Elektrokabel'naya and Cherdartseva.

Geological engineering conditions. According to hydrogeological data, as basis/base under the basements of building serve makroporistye loams and sandy loam neprosadochnaya with the calculated resistance 1.5 kg/cm. Maximum depth of ground water 1.7-2.5 m of the surface of the Earth.

Characteristic of object. Basements under the walls tape/strip, reinforced concrete, the concrete of the brand of M-50, under basement is made preparation from the concrete of M-50 10 cm. thickness.

The walls of composite construction are fulfilled from the brick of M-75 with the plastic cement-calciferous solution/opening of M-50.

Partitions plaster with plastering from two sides by alabaster solution/opening.

Overlaps from composite kruglopustotnykh reinforced concrete plate/platforms with the separate monolithic sections above toilets, about elevator in the places of large opening/apertures. The belt/zones of monolithization are fulfilled from the concrete of M-150.

Region of the zhilgorodka of TashGRES.

In this region are erected three I-graduated brick houses of the

series of 340-I and are located in the stage of building an additional three houses this same series.

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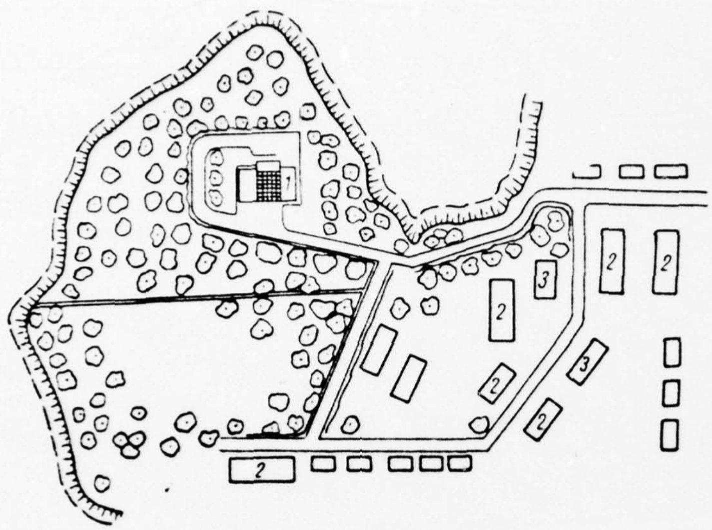


Fig. 253. General plan of the strong point of TashGRES. 1 - the building of the station of QSS; 2 - I-graduated buildings; 3 - 2-graduated buildings.

Here are also arranged 2-graduated brick standard cottages and kindergarten. Strong point in this region is provided to combine with the seismic station of the institute of seismology the A.S. the Uzb.SSR (Fig. 253).

Geological engineering conditions. Section is complex by loess loams and sandy loams. Soils yellow-pale-yellow with the connection/inclusion of calciferous concretions, makroporistye, humid. Revealed power/thickness 3.2-6.0 m.

Ground water in the period of maximum can be expected at depth from 0.7-1.8 to 3.7 m.

Design characteristic of buildings. Walls from the fired brick of M-75 in the solution/opening of M-50 (laying of the first category) with the calculated seismicity of 8 balls. The coupling of external walls, contiguity of internal walls to external and the sections of the walls, weakened by channels, are amplified by horizontal reinforcement.

Cross connections above apertures composite reinforced concrete. Partitions are large-panel, in toilets gipsocementno-concrete, on remaining locations - gipsobetonnye.

Overlaps from the composite reinforced concrete plate/platforms, monolithizedd by reinforced concrete belt/zones. Cornice from composite reinforced concrete plate/platforms. Lestinitsy from the

composite reinforced concrete panels of marchs and area/sites.

Region of zhilmassiva rice.

This region in essence is built up by the large-panel buildings of several types, including by I-shch-graduated large-panel buildings of system the KAMH which are subject first of all to equipment by seismic equipment.

Geological engineering conditions. Section from surface is covered with cultural layer with a power 0.3-0.6 m. Will lie below loam loess with a power 0.3-0.6 m, and then loam loess makroporistyy, slabovlazhnyy, with a power from 0.3 - to 1.45 m.

Page 608.

Further goes pebble in fill with fine-grained sand, power/thickness 40 m. The maximum level of ground water is 2 m of the surface of the Earth.

Region of university town on st. exhibition.

Region is built up by the I-graduated brick buildings of training housings and hostels. Strong point in this region is provided to combine with the seismic station of the institute of seismology the A.S. the Uzb.SSR.

Geological engineering conditions. Section from surface to 0.8-1.2 m is complex by soil-cultural layer, are located below loams loess, light brown color, from the slabovlazhnykh to the humid, with a power to 4.2 m. Level of ground water 9 m of the surface of the Earth.

Station ISS on the 19-graduated building of hotel "uzbekistan".

Geological engineering conditions. The area/site of building-up is accumulated by the thickness of the loess loams, from surface overlapped by in a cultured way-filled deposits with a power 1.5-2.5 m. Under filled layers will lie the thickness of the dusty loess loams, makroporistykh, solid and stiff plastic consistencies with the inclusion of the calciferous concretions, which slope in the interval of depths from 1.0-4.2 to 15.0-16.0 m. Are below loams dark brown, lumpy-nut structure with the switching on of the calciferous concretions of stiff plastic and myagkoplastichnoy consistencies. Total power/thickness of loess loams 25.0-29.5 m. Type of prosadochnosti - the first.

Ground water at depth 14.1-17.05 m.

Average annual amplitude 2.5 m.

OBSERVATIONS OF THE OSCILLATIONS OF SEPARATE/INDIVIDUAL BUILDINGS

UNDER THE SEISMIC INFLUENCES.

In period from 15 August through 10 October 1966 on some buildings g. of Tashkent by the institute of earthquake-proof building and seismology the A.S. of TadzhSSR during the assistance of the colleagues of the institute of mechanics and seismic stability of the constructions of the A.S. of the UzL.SSR the tales are organized time/temporary engineering-seismometriceskie stations for recording the behavior of constructions with the aftershocks of Tashkent earthquake. Investigations were realized with the aid of the mobile station yew, which made it possible to record/write displacement and acceleration simultaneously at 36 points. Station worked in the waiting mode/conditions. Notations were conducted by vibration detectors of the type of V3OIK, S-5-S and SPM-16 with the aid of the oscillographs N-700, completed by the galvanometers of GB-III and gilbert-the V.

Constant observation in the indicated period was conducted after 9-graduated habitable house or strong point No 1, and shch-graduated frame-and-panel administrative building according to st. of the Abdully of Tukaeva.

As a result of the observations conducted is obtained the information about periods and the forms of the oscillations of the buildings pointed out above under the effect of the weak and perceptible earthquakes, which afforded possibility to judge the

hardness of buildings only with comparatively small elastic deformations. During powerful earthquakes the strains will be considerably large; hearth by their effect the work of constructions occurs under more complex conditions, whereupon significant effect they acquire inelastic deformations.

Let us examine the design characteristics of objects of study. Standard 9-graduated habitable house. To torque/moment the investigations building not bygone given to operation - conducted finishing works.

Page 609.

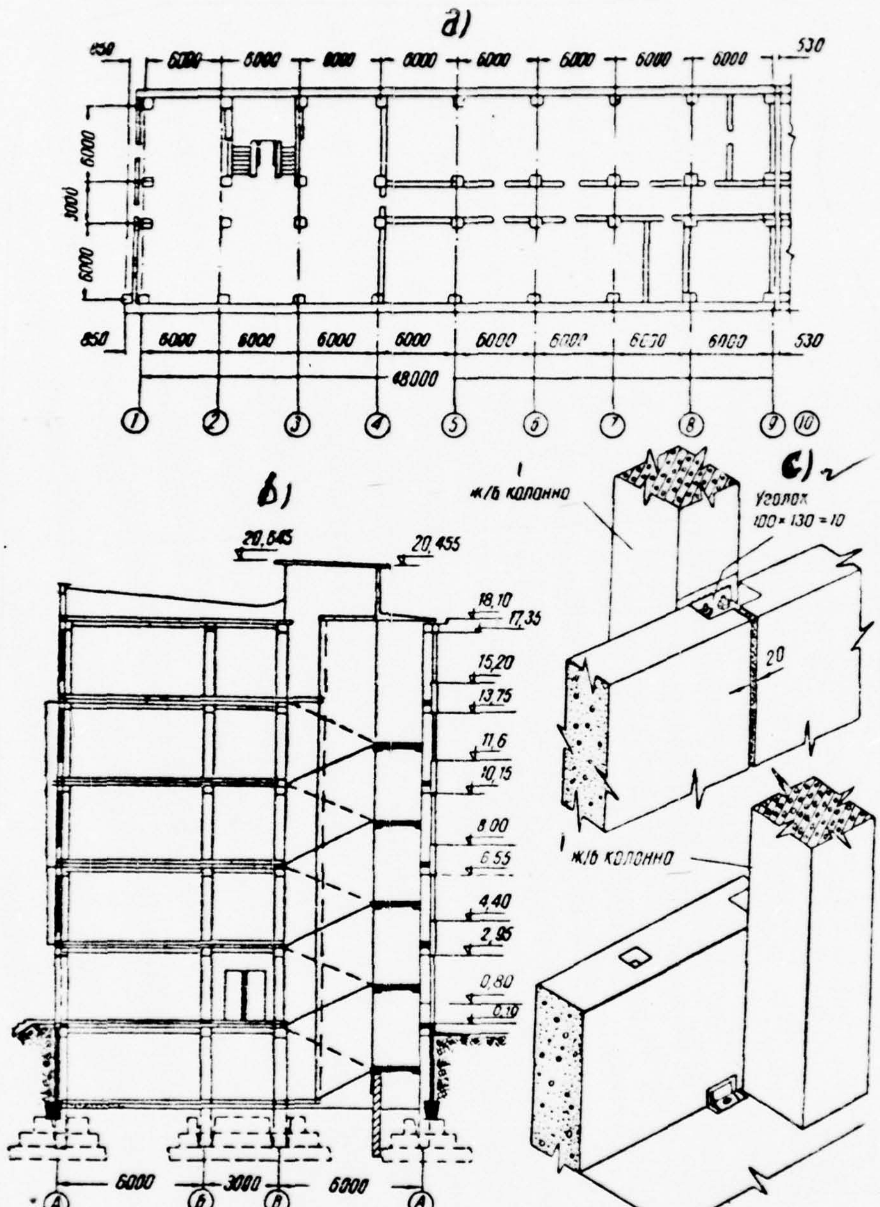


Fig. 254. Plan/layout for standard floor/stage (a), the cut/section of building (b), of the fastening of wall panels (c), the internal attachment of wall panel (d).

Key: (1). zh/b are column. (2). Angle iron.

Page 610.

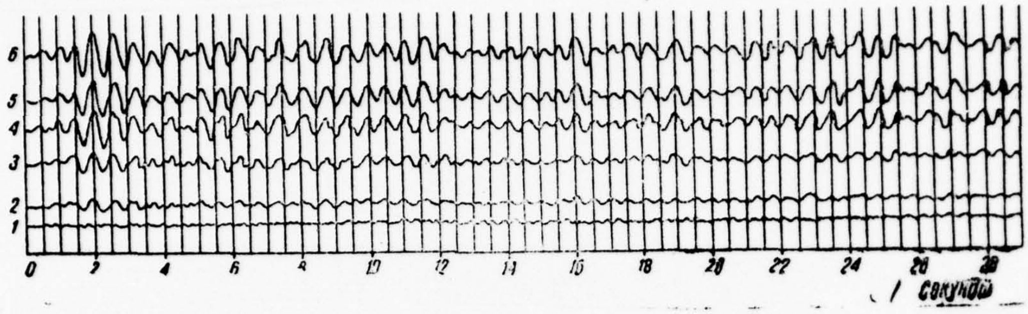


Fig. 255. The notation of the oscillations of shch-graduated house with microseism (is component x). 1 - soil, v_0 = 804; 2 - the overlap of the 1st floor/stage, v_0 = 740; 3 - the 2nd, V_0 = 745; 4 - the 3rd, V_0 = 962; 5 - the 4th, V_0 = 710; 6 - the 5th floor/stage, V_0 = 597.

Key: (1). Seconds.

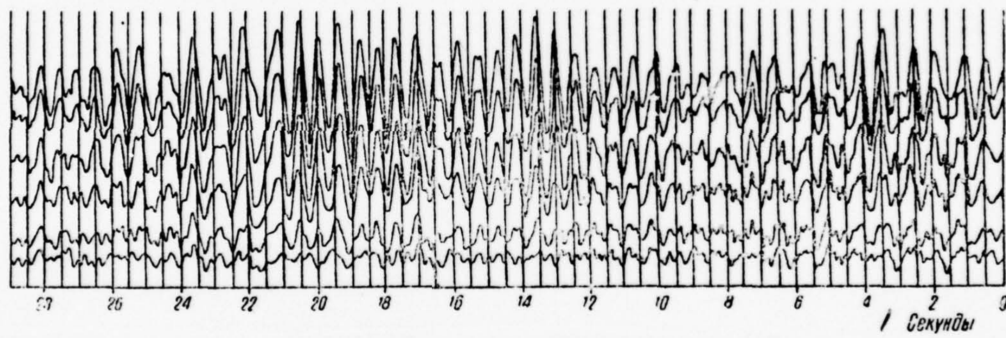


Fig. 256. The notation of the displacement of shch-graduated house during earthquake 30.IX 1966 (is component of x). 1 - soil, V_0 = 804; 2 - the overlap of the 1st floor/stage, V_0 = 740; 3 - the 2nd, V_0 = 745; 4 - the 3rd, V_0 = 962; 5 - the 4th, V_0 = 710; 6 - the 5th floor/stage, V_0 = 697.

Key: (1). Seconds.

Page 611.

Five-storied frame-and-panel building with basement, arrange/located on the third strong point (Fig. 254). For its investigation is selected the section, isolated from others by deformation earthquakeproof joints.

The framework of building is the composite reinforced concrete framework/body. Overlaps are made from the composite reinforced concrete multicone slabs, which rest on the cross bars of the longitudinal frames. In the levels of floors, are arranged the belt/zones of monolithization. By the enclosing constructions of building serve keramzit-concrete single-layer panels 30 cm. thickness. External glazing is tape/strip. The wall panels of the 1st floor/stage are fastened to columns by means of the metallic anchor which is started into the loops of column and panel, groove/slot fills with the maloprotochnym solution/opening which with seismic jerk/impulse can easily be destroyed and will not have a noticeable effect on the freedom of the mutual displacements of panels and framework/body. The wall panels of the 2nd, 3rd, 4th and 5th floor/stages - attached are fastened to columns by means of the angle iron which by one shelf with opening/apertures dresses to those which protrude anchor of panels, and another - it is welded on to the mortgage part of column. To the belt/zone of monolithization, these panels are fastened as follows: to the loop, which protrudes from the belt/zone of monolithization, they dress angle iron and secure by dowel, but other to the flange of angle iron they weld on to the

mortgage part of panel (Fig. 254). The internal baffles, gipsobetonnye,. Basements are columnar, reinforced concrete. External series of foundation block/module/units are connected by beams. As the enclosure/protection of basement serve the kruglopustotnye panels, which rest on foundation beams and which are strengthened with the aid of issues to the belt/zone of monolithization.

For determining periods, forms and logarithmic decrements of fading the investigated buildings, are used the different notations of oscillations during microseism, swaying and earthquakes (Figs. 255, 256).

During the recorded earthquakes the building oscillated in the basic form on which were superimposed the oscillations of the second tone. Five-storied frame-and-panel building with all methods of excitation oscillated in the basic form. The logarithmic damping decrement it was possible to determine only by the notation of swaying.

By the analysis of the notations of the oscillations of 9-graduated building established/installed that its behavior depends on the character of seismic effect (Fig. 257-260). If during the local earthquakes of the amplitude of oscillations buildings considerably increase from bottom to top, then during the Afghan earthquake of the amplitude of the oscillations of the floor/stages of building they

differed little from each other (Fig. 261a, b, c, d).

Let us determine the loads, which act on building during the local and Afghan earthquakes. As is known, seismic load , which acts on mass the construction in question, it can be represented by the sum: LN3

(1) $$S_k(t) = m_k \sum \ddot{z}_i(t) \eta_{ik},$$

where $\ddot{z}_i(t)$ is the given seismic acceleration for the i-th frequency and the form of natural oscillations, η_{ik} - k-a4 of the component of vector η_i, which expresses the standardized/normalized i-th form of oscillation for the dynamic design diagram of the construction in question.

Knowing values $S_k(t)$ for all masses, we obtain interesting us force R (t) at any point of the design diagram of the construction which is obtained as the linear combination of vector S (t):

$$R(t) = \sum a_k S_k(t). \qquad (2).$$

Page 612.

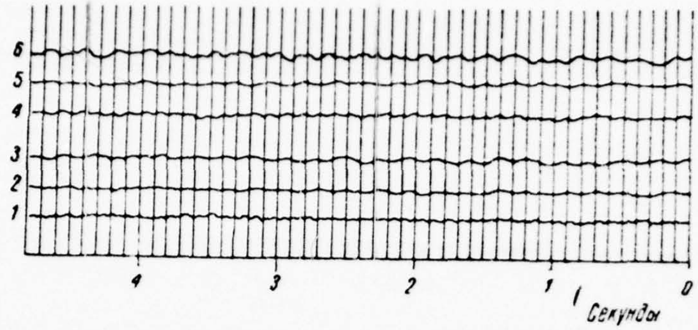


Fig. 257. Notation is microseism (is component Y). 1 - soil; 2 - the overlap of the 1st floor/stage; 3 - the 3rd; 4 - the 5th; 5 -"-go; 6 - 9-go floor/stage.

Key: (1). Seconds.

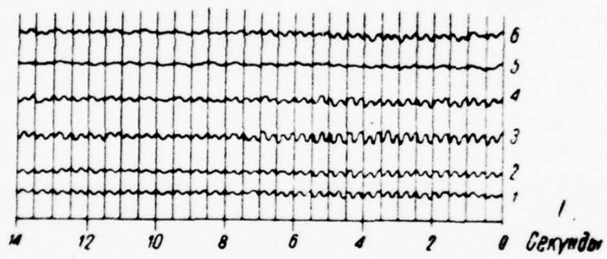
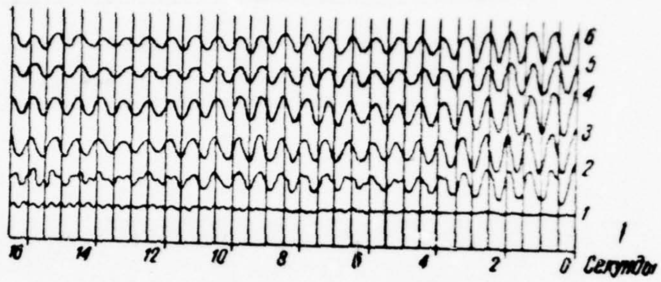


Fig. 258. Notation is microseism (is component x). 1 - the overlap of basement, V_0 = 804; 2 - the 1st floor/stage, V_0 = 352; 3 - the 3rd, V_0 = 372.5; 4 - the 5th, V_0 = 385; 5 -"-go, V_0 = 276.7; 6 - 9-go floor/stage, V_0 = 232.3.

Key: (1). Seconds.

Fig. 259. The notation of swaying (is component Y) - 1 - soil; V_0 = 804.2; 2 - the overlap of the 1st floor/stage, V_c = 704; 3 - the 3rd, V_c = 745; 4 - the 5th, V_c = 641.7; 5 -"-go, V_0 = 355; 6 - 9-go floor/stage, V_0 = 348.5.

Key: (1). Seconds.



With the aid of R (t) it is possible to determine average value , root-mean-square and maximum .

The given seismic acceleration r_1 is determined from the notations of the oscillations of building as follows. Let for each mass (or part of them) m_1, m_2, ..., design data diagram of the concentrated at the level overlaps of floor/stages be obtained the experimental notations of displacement - , and also the displacement or the basement of building R_{max}.

Eage 612a.

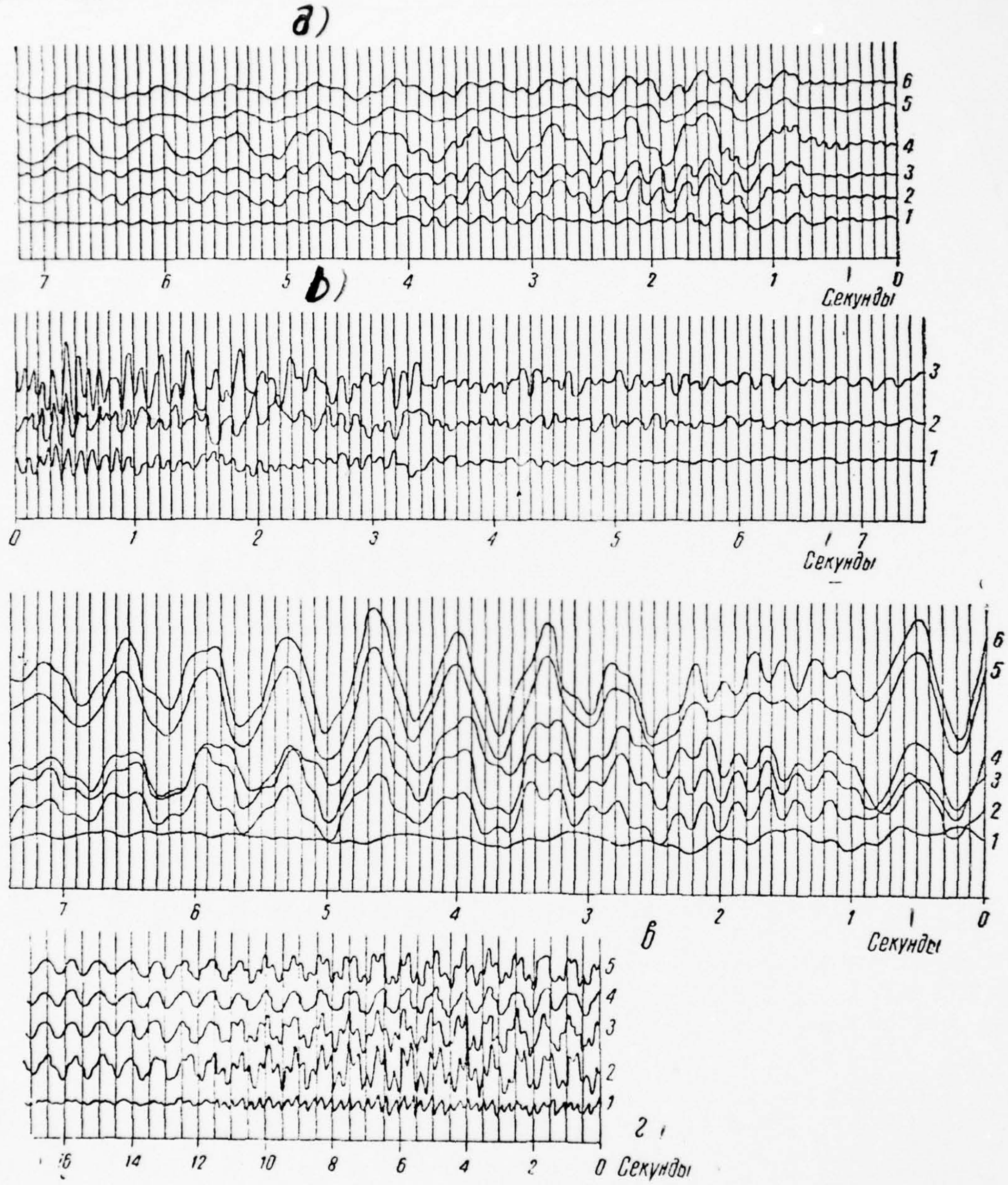


Fig. 261. Notation of displacement during the local earthquake. a) 5.IX 1966, the is component of Y: 1 - soil, V_0 = 402; 2 - the overlap of the 1st floor/stage, V_0 = 148.3; 3 - the 3rd, V_0 = 148; 4 - the 5th, V_0 = 385; 5 -"-go, V_0 = 142; 6 - 9-go floor/stage, V_0 = 138.4. b) the same, component of X: 1 - soil, V_0 = 863; 2 - the overlap of 9 go floor/stage, the point of "c" V_0 = 256; 3 - the same, the point

"a", V_0 = 1170. c) during Afghan earthquake 28.VII 1966: 1 - soil, V_0 = 863; 2 - the overlap of the 1st floor/stage, V_0 = 740; 3 - the 3rd, V_0 = 745; 4 - the 5th, V_0 = 641.5; 5 -"-go, V_0 = 710; 6 - 9-go floor/stage, V_0 = 697. d) earthquake 14.IX 1966. 1 - the overlap of the 1st floor/stage, V_0 = 376, 2 - the 3rd, V_0 = 372.5; 3 - the 5th, V_0 = 641.7; 4 -"-go, V_0 = 236.7; 5 - 9-go floor/stage, V_0 = 232.3.

Key: (1). Seconds.

Page 613.

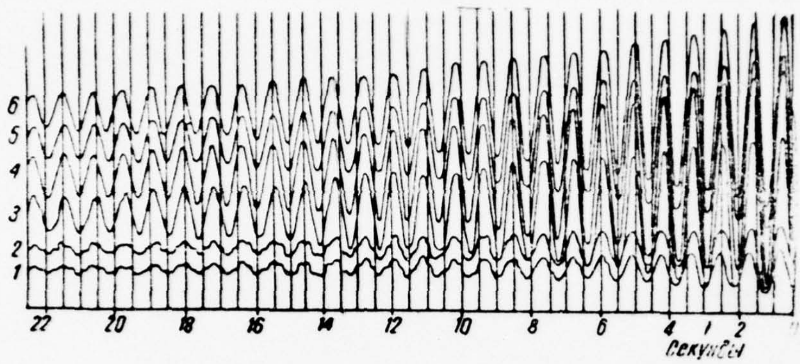


Fig. 260. The notation of swaying (is component of X). 1 - the overlap of basement, V_0 = 804; 2 - the overlap of the 1st floor/stage, V_0 = 352; 3 - the 3rd, V_0 = 372.5; 4 -"-go, V_0 = 385; 5 - 8-go, V_0 = 238.7; 6 - 9-go floor/stage, V_0 = 232.5.

Key: (1). Seconds.

The relative displacement (or elastic) of each mass it will be the following:

$$Z_k(t) = U_k\, Y_k^{\text{эксп}}(t) - U_0\, Y_0^{\text{эксп}}(t), \tag{3}$$

where U_k, U_0 it will be an increase in the instrument, which wrote displacement.

For vector Z (t) the correctly known expansion:

$$\begin{Bmatrix} Z_1(t) \\ Z_2(t) \\ \cdots \\ \cdots \\ Z_n(t) \end{Bmatrix} = \frac{\tau_1(t)}{P_1^2} \begin{Bmatrix} \eta_{11} \\ \eta_{12} \\ \cdots \\ \cdots \\ \eta_{1n} \end{Bmatrix} + \frac{\tau_2(t)}{P_2^2} \begin{Bmatrix} \eta_{21} \\ \eta_{22} \\ \cdots \\ \cdots \\ \eta_{2n} \end{Bmatrix} + \cdots, \tag{4}$$

where P_1, P_2 are frequencies of the corresponding forms of free oscillations.

In expansion (4) it will be as many terms, as forms of oscillations is obtained as a result of concrete/specific/actual experiment. So, for 9-graduated frame-and-panel building in the process of experimental studies are obtained two forms of oscillation with periods of T = 0.66 s. and T = 0.23 s. From the oscillograms, obtained during earthquakes (Fig. 262), it is easy to isolate these two predominant periods and to construct corresponding to them the forms of oscillations. In this case vector Z (t) is composed of two

vectors:

$$Z(t) \cong Z_1^{\bullet}(t) + Z_2^{\bullet}(t). \qquad (5).$$

For each of them it is possible to write the following equalities:

$$\begin{vmatrix} Z^{\bullet}_{11}(t) \\ Z^{\bullet}_{12}(t) \\ \cdots\cdots \\ Z^{\bullet}_{1n}(t) \end{vmatrix} = \frac{\tau_1(t)}{P_1^2} \begin{vmatrix} \eta_{11} \\ \eta_{12} \\ \cdots\cdots \\ \cdots\cdots \\ \cdots\cdots \\ \eta_{1n} \end{vmatrix}, \quad (6) \qquad \begin{vmatrix} Z^{\bullet}_{21}(t) \\ Z^{\bullet}_{22}(t) \\ \cdots\cdots \\ \cdots\cdots \\ Z_{2n} \end{vmatrix} = \frac{\tau_2(t)}{P_2^2} \begin{vmatrix} \eta_{21} \\ \eta_{22} \\ \cdots\cdots \\ \cdots\cdots \\ \eta_{2n} \end{vmatrix}. \quad (7).$$

Multiplying the left and right sides of equality (6) scalarly to vector with components $m_1\xi_{11}$, $m_2\xi_{12}$, ..., $m_n\eta_{1n}$, we will obtain:

$$m_1 Z^{\bullet}_{11}(t)\eta_{11} + m_z Z^{\bullet}_{12}(t)\eta_{12} + \cdots + m_n Z^{\bullet}_{1n}(t)\eta_{1n} = \\ = \frac{\tau_1(t)}{P_1}\left\{m_1\eta_{11}^2 + m_2\eta_{12}^2 + \cdots + m_n\eta_{1n}^2\right\}. \quad (8)$$

hence

$$\tau_1(t) = P_1^2 \frac{m_1 Z^{\bullet}_{11}(t)\eta_{11} + m_2 Z^{\bullet}_{12}(t)\eta_{12} + \cdots + m_n Z^{\bullet}_{1n}\eta_{1n}}{m_1\eta_{11}^2 + m_2\eta_{12}^2 + \cdots + m_n\eta_{1n}^2}. \quad (9).$$

Analogously from equality (7) we will obtain:

$$\tau_2(t) = P_2^2 \frac{m_1 Z^{\bullet}_{21}(t)\eta_{21} + m_2 Z^{\bullet}_{22}(t)\eta_{22} + \cdots + m_n Z^{\bullet}_{2n}\eta_{2n}}{m_1\eta_{21}^2 + m_2\eta_{22}^2 + \cdots + m_n\eta_{2n}^2}. \quad (10).$$

Thus, by knowing the experimental dynamic characteristics of building and by having notations of displacement of its masses, it is possible to determine the given acceleration, and then by formulas (1) and (2) - the which interest us forces.

Page 614.

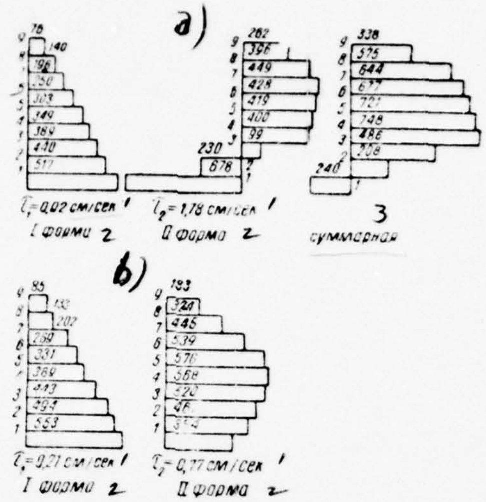


Fig. 262. Design diagram, the seismic loads, determined on SNiPA 12-162 (a) and per the recommendation of V. T. Rasskazovskiy, T. R Rashidova, K. S. Abdurashidova (b).

Key: (1). cm/s. (2) forma./ (3). summarrya.

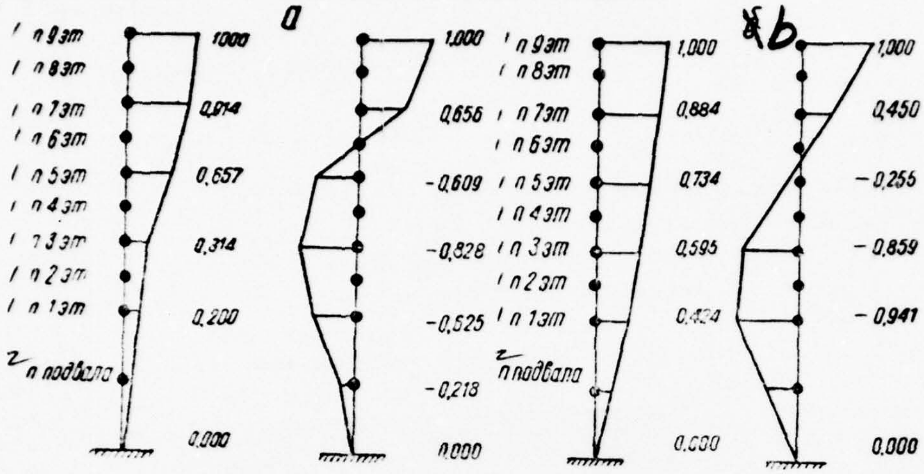


Fig. 263.

Key: (1). p [illegible] et. (2). the p of basement.

In this case for determining the given seismic acceleration and the corresponding to them seismic loads from the notations of oscillation, were undertaken the maximum values of displacement in each form separately. In this case, the maximum values of displacement in the first and second forms for the local earthquake approximately synchronize, and for Afghan - they begin at different points in time.

According to the procedure presented, is calculated the maximum given acceleration in the first and second forms, are calculated loads and are constructed the diagram/curves of shearing force (Fig. 263).

Calculations regarding the dynamic characteristics of the buildings, executed during design, gave the results, differing significantly from the real. So, the periods of the natural oscillations of building as a result of the calculations during design are equal to: s, s relative to both axes. In reality as it was explained from the analysis of the obtained materials of full-scale investigations, building accomplished oscillations relative to axis x-x with periods s. (less in comparison with that which was given above almost two times) and s., relative to axis at-at with periods s. and s. This difference is connected with the fact that in spite of the definition of the constructions of skeleton buildings,, until now, still not is completely revealed the effect of different factors, such, as degree of the hardness of overlaps, various kinds of filling of framework/body, to the work of building as a whole in the presence

of earthquakes.

Wall attached panels, for example, during determining the dynamic characteristics of frame-and-panel buildings usually are considered as supplementary mass-load on framework/body. Between the fact, they can substantially affect the characteristics and the hardness of building because of friction the contact surfaces. Accomplished/carried out calculations of this building taking into account the hardness of filling gave a good agreement with experiment.

For a shch-graduated building the role of panels in the common/general/total hardness of construction is insignificant. The dynamic parameters, determined in terms of the calculation not allowing for the hardness of filling, differ little from reality.

Page 616.

Table 50. Ground conditions and the geological cut/section of the sites of installation of stations.

1 Грунт	2 Грунтовые условия станций			3 Геологический разрез по данным бурения в эпицентральной зоне
	4 „Лугина"	5 „Ташкент"	6 „Алмазар"	
7 Лёсс	11 До 25 м	11 До 32 м		8 Четвертичные — 225 м
9 Суглинки			11 До 10 м	10 Неоген — 1375 м
12 Мергели	11 До 150 м	11 До 50 м		13 Палеоген — 1525 м
				14 В. мел — 2025 м
				15 Н. мел — 2325 м
16 Уровень грунтовых вод	20 м	20—22 м	5,0	17 Триас-юра — 2400 м
				18 Палеозойский фундамент (его кровля отмечена на глубине 2500 м)

Key: (1). Soil. (2). Ground conditions of stations. (3). Geological cut/section according to data of boring in epicentral zone. (4). "Lugina". (5). "Tashkent". (6). "Almazar". (7). Loess deposits. (8). Quaternary. (9). Loams. (10). Neogen. (11). To. (12). Marls. (13). Paleogen. (14). V. chalk. (15). N. chalk. (16). Level of ground water. (17). trias-Jurassic. (18). Paleozoic basement (its roofing is noted at depth 2500 m).

Table 51. Some cell/elements of the value of velocity v, of the acceleration a', which characterize oscillating process in the uppermost phase of transverse wave.

Key: (1). Station and date. (2). Component. (3). T, s. (4). cm/s. (5). sm/ (cm/s²). (6). Equipment. (7). Intensity. (8). according to the scale of IFZ. (9). data CSS. (10). Lugina. (11). Almazar. (12). S5S. (13). VBP. (14). VEGIK.

Table 51

1 Станция и дата	2 Составляющая	3 T, сек.	X_0, мм	4 v, см/сек	5 a, см/см·сек²	6 Аппаратура	7 Интенсивность: 8 по шкале ИФЗ	7 Интенсивность: 9 данные ЦСС
10 Лугина 5.VI 1966 г.	С—Ю	0,43	2,6	3,8	55	С5С 12	7	—
	В—З	0,3	0,65	1,7	40	ВБП 13	6	7
		0,3	0,9	1,8	40	С5С 12	6	
10 Лугина 29.VI 1966 г.	С—Ю	0 4	2,5	4,0	60	С5С 12	7	
		0,3	0,7	1,7	40	С5С 12	6	
	В—З	0,25	1,9	5,0	100	ВБП 13	7	7
11 Алмазар	С—Ю	0,33	1,3	3,5	60	ВЭГИК 14	6—7	
ЦСС		0,4	1,2	2,0	30	ВЭГИК 14	6	
ЦСС		0,22	0,05	1,5	40	ВЭГИК 14	6	
12 Алмазар 4. VII 1966 г.	В—З	0,26	1,0	2,6	60	ВЭГИК 14	7	7
10 Лугина 29.VI 1966 г.	В—З	0,3	0,08	0,2	3,5	ВЭГИК 14	4	
11 Алмазар	В—З	0,27	0,35	0,8	20	ВЭГИК 14	4—5	4—5
11 Алмазар	С—Ю	0,3	0,28	0,55	15	ВЭГИК 14	4—5	
ЦСС	В—З	0,26	0,23	0,55	15	ВЭГИК 14	4—5	

SEISMIC OSCILLATIONS OF SOIL WITH THE POWERFUL AFTERSHOCKS OF TASHKENT EARTHQUAKE AND SOME OF THEIR SPECTRAL SPECIAL FEATURE/PECULIARITIES.

For research on destructive processes during earthquakes, it is necessary to know the special feature/peculiarities of the seismic oscillations, caused by them on the surface of the Earth. Most dangerous for buildings are the horizontal oscillations which, kakpravilo, prevail during powerful earthquakes.

When conducting instrument/tool investigations in the epicentral zone of Tashkent earthquake in several point/items of tale, are established/installed special seismic stations for recording powerful earthquakes.

Page 617.

Fig. 264. Seismograms of the displacement of soil during earthquakes. Stage of the Lugina: 1 - 29.VI 1966, , 7 balls; 2 - 5.VI 1966, , 7 balls. Stage of 'OSS"; 3 - 29.VI 1966, , 5-6 balls; 4 - 5.VII 1966, , 4 balls; 5 - 4.VII 1966, , 3 balls.

In the assembly of seismic station, entered the following equipment: the seismometers of S5S, T = 5 s, and the vibrographs of V3GIK, T = 1.2 s, and VBP-III, the galvanometers of system GB-IV with natural vibration frequency 10 and 15 Hz. Recording was realized with the aid of the engineering-seismological oscillograph of ISO-II, working the waiting mode/conditions and being switched on with the aid of seismoscope from the first arrival of incident wave S. The sensitivity of seismoscope was determined by the amplitude of the displacement of the first arrival.

The frequency characteristics of channels seismograph - galvanometer provided the undistorted notation of the displacement of soil in the range from 0.04 to 0.55-0.6 s. with an increase in channels 5 and 12.

The stations were arrange/located in the basements of the following point/items: "Lugina" they was arrange/located poul. Lugina in house No 114; "Tashkent" - indoor of central seismic station; "Almazar" - in house No 13 on large Almazarskoy route; "is theatrical" - in the building of the theatrical artistic institute im. A. N. Ostrovskiy on st. German Lopatin (is earlier silkworm), house No 77.

Stations were located in epicentral zone at a distance 1-3 km of each other.

Ground conditions and the geological cut/section of the sites of

installation of stations are given in Table 50.

In the process of observations, are recorded the earthquakes of different intensity - from 3 to 7 balls.

Figure 264 gives the seismograms of the displacement of soil during the earthquakes of different intensity. In terms of characteristic feature differed the notations of oscillation in transverse wave S. As a rule, phase S was recorded by the intense oscillation in the form of burst, in form recalling a wave of the type of shock. Its value in the dynamics of oscillating process bygone prevailing. The value of the maximum displacement into longitudinal waves r of Tashkent earthquakes was 40-50c/c of the maximum values of displacement into transverse wave S.

Thus, it is possible to assume that the basic seismic effect of the destruction of constructions was caused by the powerful transverse wave S. Some cell/elements of the value of velocity of V, acceleration α, that characterize oscillating process in the uppermost phase of transverse wave S, are calculated and given in Table 51.

As a result of the comparison of the spectra of amplitudes [1] the uppermost phase of oscillations in transverse wave S of the earthquakes of different intensity (Fig. 265a, b) established/installed that with equal depths and epicentral distances with an increase in the energy of seismic center the maximum value of

the period of the oscillations of wave S is displaced to the side of low frequencies.

FOOTNOTE [1]. The spectra were designed on EVM [- computer] according to N. I. Durakov's program. ENDFOOTNOTE.

Page 618.

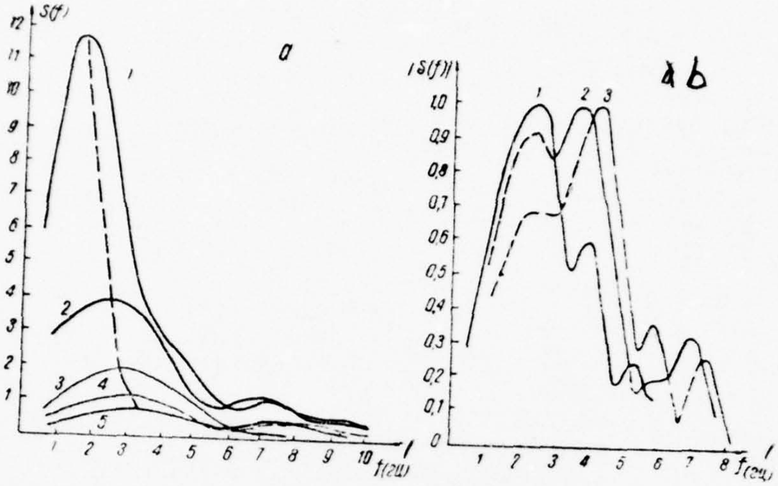
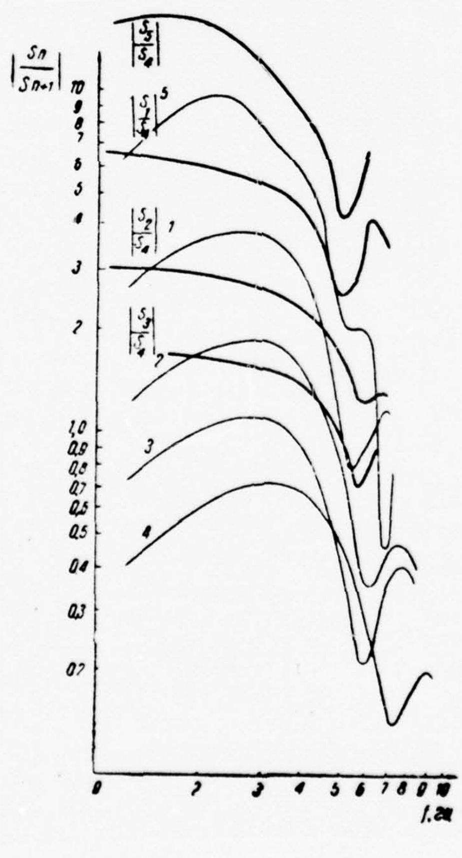


Fig. 265. Given spectra of displacement into the uppermost phase of transverse wave.

Key: (1). f (Hz). (2). balls. (3). ball.

Fig. 266. Spectra and their relations for the seismic centers of different energy classes on uppermost phase S.

Key: (1). f, Hz. (2). Stage "Tashkent". (3). Stage of "Lucina".



Page 619.

The extrapolation of the values of periods in the uppermost phase of the wave of the aftershocks of different intensity determined wave period the Tashkent earthquake on 26 April 1966

s.

In view of the uniformity of the form of the notation of the majority of aftershocks with the equal depths of origin/hearths and hypocentral distances it is possible to assume that the mechanism of origin/hearths and the direction of the planes of their discontinuities are connected with one and the same tectonic processes. In connection with this we examined the relation of the obtained by us spectra of the amplitudes of displacement into the phase of several seismic centers of the different energy classes of energy (Fig. 266). Comparison is conducted according to data of station "Tashkent" with the enlistment of data of the station of "Iugira".

As a result it is revealed, that the spectral curves, which characterize the relations of the spectra of origin/hearths, beginning approximately with frequency in 6 Hz, are arranged over a wide range of frequencies, but with uveilcheniyem the energy of origin/hearth they smoothly are risen into the range of low frequencies. Unfortunately, data of equipment did not make it possible to trace a further change of the spectral special feature/peculiarities in the range of low frequencies.

During the comparison quantitative of data of the amplitudes of the periods of the oscillations, measured on surface during the earthquakes of different intensity (from 3 to 7 balls), and the spectral special feature/peculiarities of oscillating processes with the spectra of seismic centers revealed great effect on the character of the seismic oscillations of the filtering (absorbing) properties of the geological medium, presented in epicentral zone by the powerful layer of unconsolidated and sedimentary deposits.

Apparently, the dynamic characteristics of oscillating processes during powerful earthquakes and their spectral special feature/peculiarities can be taken into account during the design of building in Tashkent.

End section.

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Page 620.

Chapter VII.

Organization of the medical service of the population and urgent problems of counterepidemic service in ~~a~~ the period of the liquidation of the consequences of earthquake 1966.

COMMON/GENERAL/TOTAL QUESTIONS OF THE MEDICAL SERVICE.

After the earthquake during the extremely large scales of the reducing works under conditions of a hot climate, was created the real threat of epidemics. However, it is avoided by the maximum provision for a counterepidemic mode/conditions at home, by the one hundred percent hospitalization of all infectious patients, by the pereprofilirovaniyem of the existing hospitals with the provision for the necessary vnutribol'nichnogo mode/conditions, the intensification of the monitoring/checking above drinking water, public health education propaganda during press, on radio and television with the

wide participation of medical researchers, etc. (dynamics of morbidity for entire 1966 it differed little in the number of infectious diseases from the preceding/previous summers).

More difficult problem for the medical workers proved to be the enclosure/protection of people from neuro-psychic reactions and their different complications in the rezul'tae of earthquake. The emotional reactions, soprovozhdayushchiyeya by vital fears, are the result of the vliriya of the powerful stressors, which lead to the large rearrangements of the neuroendocrine system of organism with the emergence of the reaction of tension. This state is characterized by common/general/total excitation, angiospasm, by emergence of constant alertness, by irritability, disturbance of sleep, by inadequate reactions, etc.

According to data of Kh. A. Alimov and N. N. Vaserfirer, the asthenic phenomena of the nervous system, which are combined with vegetative-vascular shift/shears, were observed not only in the period of powerful underground jerk/impulses, but also after several months.

If the emergence of common/general/total adaptive syndrome as a result of the inclusion of system hypophysis-adrenals into the torque/moment of the action of stressors for a normal organism is shielding mechanism, then with some diseases, especially vascular, it leads to the disturbance of the existing compensation, i.e., relative prosperity in the human organism with the emergence of the

disturbances of cerebral and coronal/ring blood circulations. By this is explained a considerable increase in the increase in the acute/sharp assaults of coronary insufficiency - stenocardia, the myocardial infarction, hypertonic crises and other acute/sharp cardiovascular complications, acute/sharp disturbances of mozogovogo blood circulation - cerebral ishemicheskikh strokes, the hemorrhages to brain, which especially pass over the ishemiy of brain (Z. I. Umidova, N. M. Madzhidov, N. S. Petrov and F. K. Kamilov).

In the works of the indicated authors, is noted the direct/straight dependence of the konichestva of the vascular diseases of heart and brain on force and frequency of underground oscillations, and also the considerable peculiarity of clinical current and their issue.

Page 621.

The negative emotions, caused by earthquake, have a powerful effect also on enlokrinnuyu system, which plays the dominant role in the organization of common/general/total adaptive syndrome.

E. G. Kayumov notes the renewal of illness/sickness/disease in the clinically recovered patients with diabetes and thyrotoxicosis, and also a considerable increase in the quantity of first-admission patients with these diagnosis. The nervous overvoltage in this case, obviously, led to the manifestation hidden pathology taking place as a

result of the disturbances of the compensator possibilities of organizma.

According to data of M. S. Tursunkhodzhaevoy and A. Shadmanova, in the period of the action of prolonged stressor increases the content of cholesterol in blood serum, which leads to the progression of atheroskleroSis.

Thus, the first destructive earthquake and the subsequent powerful jerk/impulses led to deep rearrangements of organism, large functional changes in vascular and endocrine systems with the appropriate disturbances of metabolic processes and different biochemical shift/shears. In a number of cases, these sharp shift/shears contributed to the emergence of the organic pathology that sometimes led to sad issue.

For dealing with all effects of earthquakes enumerated above on the human organism, were combined the therapeutists, the endocrinologists, the neuropathologists, the psychiatrists, infektsionisty, epidemiologists, surgeons, accoucheur-gynaecologists, etc.

Are studied the different somatic diseases, which arose as a result of earthquake, however, the works yet completed and require the further deepened investigation both pathology itself and the searches for preventive maintenance and treatment of these diseases.

 1060

SPECIAL FEATURE/PECULIARITIES OF THE ORGANIZATION OF THE MEDICAL SERVICE OF POPULATION IN A PERIOD OF THE LIQUIDATION OF THE CONSEQUENCES OF EARTHQUAKE.

As a result of the earthquake on 26 April 1966 in Tashkent, arose the complex situation, required from the organ/controls of authority and medical service of the acceptance of urgent measures for the liquidation of the consequences of stizhiynogo calamity.

The created during the first days government boards (union of SSR, uzbek SSR, urban and district) on the liquidation of consequences, the earthquakes directly led organization and the realization of state measures for the rendering of comprehensive aid to injured/damaged population (solution to housing problem, the provision for a public and sanitary order in city, the creation of conditions for the normal operation of enterprises - kommunal'nobytovykh, commercial, public nutrition, children's and medical institutions, taking summer sanitation measures for the children, etc).

The government boards provided the mobilization of all available state reserves, actively assigned townspeople on fight with consequences calamities. In this case, the problems, connected with prosperity and okhraoy the health of the injured, were considered as questions of primary state importance. In the composition of

government boards, entered the leaders of the organ/controls of edravookhraneniya.

Page 622.

For the operational control of forces and the means for organ/controls and institutions of public health with the Ministry of Public Health of uzbek SSR, urban and the district divisions of public health g. of Tashkent are organized the staffs or the liquidation of the sanitary consequences of earthquake.

The organ/controls of public health of city did not have a work experience and were not arrange/located with the plan/layout for action on the case of natural calamities, since, first of all, in the territory of Tashkent for the latter 100 summers was not noted similar earthquakes, in the second place, the experiment of other cities under conditions of the extreme circumstances, caused by natural calamity, insufficiently was studied and illuminated in the literature.

On the basis of the examination/inspection medical conducted institution are developed operational plan/layouts by the liquidation of the consequences of earthquake in city and region. in plan/layouts are determined measures for each medical institution, the order and the periods of their execution.

From the first day of natural calamity, the service of public

health is transferred to special operating mode: are established/installed 24-hour duties with all staffs, hospitals, dispensary-polyclinical institutions.

By the workers of public health are executed the laborious works on the protection of the patients, that were being located in the hospitals, arrange/located in the zone of epicenter. During the first day more than 2000 patients are extracted of the damaged hospitals for dispensary treatment home and more than 1000 are transferred into other hospitals. part of the nontransportable patients is placed in summer pavilions and tents in the territory of hospitals or is transferred from the upper levels into lower.

Rescue operations on the carrying out of the sick children from the destroyed and threatened emergency stationary medical children's institutions, their translation/conversion into safe places, protective measures from the consequences of earthquake were carried out in essence by the attendant personnel of institutions, which revealed in this case exceptional selflessness sometimes with risk for a life.

In the day of the earthquake on 26 April by therapeutic institutions it is recorded 749 cases of traumas.

After powerful repeated earthquake on night from 9 on 10 May, it is recorded 207 cases of traumas.

On the basis of the presumable forecast/predictions of urban seysmostantsii about the possible repeated powerful jerk/impulses on 24 May and on 5 June (forecast/prediction was confirmed) the organ/controls of public health conducted supplementary measures for the prevention of the possible sacrifices.

With the subsequent iterative impulses (aftershocks) the number of injured with traumas in spite of the high intensity of earthquakes did not exceed 30.

In all during entire period of underground jerk/impulses it is recorded 1623 cases of traumas, in this case into 364 cases the first medical aid is shown by the personnel of the station of first aid, 246 - by receiving rests even 78 - by dispensary-polyclinical institutions. Suppressing number of traumas light/lung and average gravity.

To all patients with traumas is shown timely medical aid and given further treatment in the specialized agencies of city.

In the rendering of the first medical aid to injured with traumas, with neuro-psychic changes and heart assaults the leading role belonged to the urban station of fast and urgent medical aid.

Page 623.

In spite of the complete destruction or the building of station and the disturbance of telephone communication, after the first jerk/impulse of earthquake attendant personnel, having correctly evaluated situation, directed all forces of station toward the rendering of the medical aid to injured in the most destroyed part of the city. With the subsequent powerful underground jerk/impulses practiced the active departure of the machines of first aid into the especially dangerous regions of epicenter and tent towns for the rendering of the necessary aid to injured, without expecting the admission of calls.

In connection with an increase in the number of acute/sharp heart assaults with the station of first aid, are additionally organized the specialized brigades.

One should especially emphasize that reorganization by Gorzdravotdelom even to the earthquake of the system of urgent aid in Tashkent (administrative association of the station of first aid with the separate point/items of urgent aid with polyclinics with single dispatchers and the radio installation of machines) contributed to an increase in the effectiveness and afforded possibility to maneuver with all means for service during catastrophe.

The station of first aid, the receiving rests of stationary institutions and polikalinik in night time in the period of the

earthquake of tale are intensified by supplementary ambulance transport, by the medical personnel/frames and property.

The cases of traumas as a result of earthquake were recorded mainly among the inhabitants, living in the zone of the epicenter of earthquake. Most of all traumas it is recorded among the inhabitants of Kirovskiy (650), of October (275) and Leninist (252) regions.

The relatively small number of injured in city with population more a million of people, with the epicenter of earth shock in the most densely populated part, with a considerable quantity of powerful aftershocks is explained predominantly by the vertical character of underground jerk/impulses, in also by timely taking measures for the protection of population.

The analysis of the reasons for traumas shows that into 10o/o of cases of trauma are obtained from collapse and collapses of walls and roofs, into 35o/o - from the falling/incident structural/design parts of the buildings and constructions (plastering, bricks, household articles) and in by the shchshchc/opprichirami of traumas is bygone the behavior of injured themselves, not known the actions, caused by panicky state, fear (vyprygivaniye from the upper levels, injuries against different object/subjects, etc).

From the very beginning of natural calamity in city, is expanded/scanned extensive explanatory work among population. The

created press center with Tashkent city committee the CP of uzbekistan performed comprehensive mass agitation work and the periodic information about measures for the liquidation of the consequences of earthquake and the restoration/reduction of city.

The routine appearances of the outstanding specialists - the scholarly-seismologists of the country and Tashkent seismic station - in press, on radio, television about character and the essence of Tashkent zemletyaseniya were the damping factor for townspeople during the critical days of earthquake.

The buildings of the majority of the medical institutions after the first underground jerk/impulse on 26 April turned out to be in different degree those which were damaged, the number of therapeutic institutions, out-of-order, with each subsequent underground jerk/impulse it grow/rose. From 140 medical institutions 118 obtained the damages, in this case 22 completely they left the system and tale, were born. 5315 cots by polnst'yu or partially they left the system, which comprises more the half of entire koyechnogo fund.

Page 624.

Of 51 dispensary-polyclinical institutions 37, in full or in part they ended the work in their buildings.

The majority of the damaged stationary and dispensary-

polyclinical institutions initially worked in uncommon for them field conditions, under the open sky. Subsequently they continued the work in the isolated by it tents of military specimen/sample. Some polyclinical institutions organized the method of the patients in the temporarily given by it administrative and school buildings.

Government board into the first days of natural calamity made a decision to the transmission of 11 complexes of the buildings (boarding schools, health resorts and administrative locations), arrange/located in the boundaries of city far from the epicenter of earthquake, to the medical institutions, suffering from earthquake. Tashgorispolkom gratis transmitted to the organ/controls of public health the solid and soft stock of some boarding schools, which made it possible in a comparatively short period to adapt the transmitted buildings under the medical institutions and to initiate in them the method of the patients.

Tales are created ,mpgp:rpfcy"muye the statscpmarmuye of ichrekdemoya mA 3370 cots. Thus, already in the first half of May completely was completed the lost as a result of calamity koyechnyy fund of city. Simultaneously were carried out the fundamental-reducing works in the medical institutions. To 1 July 1967 hospital fund of Tashgorzdravotdela counted to 900 cots more than there was to earthquake.

In connection with the occurred after natural calamity changes in

the arrangement/permutation of the medical institutions, was carried out extensive work on the redistribution of the medical personnel/frames, equipment by the necessary stock of the newly open institutions, to the pereprofilirovaniyu of hospital fund and to the review of the boundaries of the medical sectors between polyclinics.

The considerable part of the population, suffering from earthquake, during the first days was placed in the tents, established/installed next to their destroyed houses, then it was placed in the organized palotochnykh towns in the territory of park/fleets, ozelennykh areas, gardens with the observance in them of the required health and hygiene, communal general conditions and by the provision for a public order.

In all in city it is organized 60 tent towns after which were secured near the arranged/located polyclinics. Not far from city temporarily they were placed 50 medical and surgeon's assistant's medical aid stations in tents, more than 40 pharmaceutical tray/chutes and kiosks, functioned movable medical and pharmaceutical point/items.

For the medical and sanitary provision for measures for the liquidation of the consequences of earthquake in the places of the removal/drift of emergency buildings, and also performing urgent crash rescue work, it is created 2 time/temporary movable point/items in tents.

In connection with large building in city, a quantity of builders increased more than 3 times because of the new set of workers, arriving out of other cities. For providing the medical service of builders during May 1966, is organized medical and sanitary part with Glavtashkentstroye in the composition of the hospital of polyclinic and sanitary-counterepidemic isolation/evolution.

Medical-sanitation section in intimate contact with administration and the public organizations of construction trusts attained the determined results in an improvement in the working conditions and mode of life of builders.

Page 625.

For the prevention/warning of the negative effect of the continuing underground jerk/impulses and flight than the heat is organized mass the export of the children into out-of-town sanitation institutions. In 1966 for summer in urban and out-of-town pioneer camps, sanatoriums and the health resorts of sister union republics, it rested more than 140 thousand children (2 times it is more than in the preceding/previous year).

In connection with earthquake is rebuilt the system of dispensary-polyclinical aid to population. dispensary-polyclinical institutions obtained supplementary ambulance transport, is considerably increased the medical personnel because of the

temporarily convolute hospitals, Republican therapeutic institutions, scientific research and medical institutes, to the maintenance of the patients, is drawn the large number of students and learning old courses of Tashkent medical institute and school.

Significant assistance rendered arrive of Moscow and Moscow region more than 180 physicians who prolongedly time worked in hospitals and the urban station of first aid. Especially one should note participation in taking the preventive medical measures of sanitary activists from population, prepared by the urban organization of the society of red demilune. Inestimable assistance rendered the medical workers activists from the bureau patronazhnykh sisters and small circles of handling the patients at home.

Because of the in proper time carried out rearrangement of the work of lechebnoprofilakticheskikh institutions on the liquidation of the consequences of earthquake, the volume of the shown medical aid to population in 1966 in comparison with preceding/previous did not decrease for years, but vice versa somewhat it increased.

In 1966 increased the number of patients with stenocardia, by hypertonia, by stroke, treotoksikozom, by sugar diabetes, by the gastrointestinal diseases and other illness/sickness/diseases, connected with the prolonged nervous-emotional overvoltage of organism and change in the usual public and domestic sanitation living conditions. In connection with this before the organ/controls of

public health and the medical workers, arose urgent problems in further intensified research on the status of the health of population and preventive maintenance of the separate/individual sanitary consequences of earthquake.

On wide scale by the state health and hygiene and protivoepidemicheskimi measures conducted with the active participation of an entire community are prevent/warned the outbreaks of the infectious diseases, which are, as a rule, by the satellites of stizhiynykh calamities.

CONCLUSIONS.

Because of the association of the urban station of first aid with the independently existed point/items of urgent aid provided for the maneuvering with forces and the means for station and their more effective use on sections with the greatest quantity of the injured.

Mutual information and contact between the medical and seismological services g. of Tashkent in the period of the liquidation of the consequences of earthquake positively had effect on the solution of the operational problems of the organ/controls of public health (correct arrangement/permutation and the redislocation of the medical institutions taking into account earthquake-hazard zones, the translation/conversion of the medical service into special operating mode in accordance with data of seismic forecasting repeated powerful

jerk/impulses and the use of a seysmopropagandy as factor of the softening of the nervous-emctical overvoltage of population).

Page 626.

As a result of research on the medical consequences of earthquake, the authors propose following.

1. In the cities, arrange/located in seismic dangerous zones, must be given special attention to the instruction of population in rendering self- and to the mutual assistance, the preparation of entire medical composition for the timely rendering of medical aid in the origin/hearths of natural calamities.

2. To study the distant sanitary consequences of earthquake in Tashkent, to yearly carry out the mass preventive inspections of population with the wide introduction of the clinic method of maintenance.

3. To lay on staffs and services of civil defense organization and taking of systematic measures for the protection of population from natural calamities and management/manual in rescue operations.

For seismic dangerous cities and regions, it is necessary to have plan/layouts for the preparation of staffs, services and shaping of GO in the case of catastrophical earthquakes.

4. To relate the buildings of hospital institutions in the regions of seismic dangerous zones according to the character of designation/purpose (in norms "SNIP [- Construction norms and regulations] II-A, 12-62") to the category of the objects, which require the application/use of a supplementary coefficient of seysmoprochnosti and limited to etazhnoti (it is not more than three).

Urgent ZADAChi of counterepidemic service in a period of the elimination of the consequences of earthquake in Tashkent.

As a result of the Tashkent earthquake several ten thousand of families, after depriving of roof, they proved to be in unusually heavy life condition. The migration of people into tent towns, in the locations of schools and hostels, interruptions with water supply, breakdown of the existing sewerage constructions, the destruction of industrial plants impaired the working conditions and mode of life. People are, being located under the effect of frequent underground jerk/impulses, tales in emotionally heavy state.

Furthermore, g. Tashkent up to the torque/moment of the emergence of natural calamity was in epidemiological relation burdend, since the yearly spring-summer lift of the gastrointestinal diseases coincided with earthquake. As a result were created the actual conditions for the emergence of different diseases, including infectious. ten thousand of people, arrive of all union republics, lived and worked in

the unusual for them conditions of a kharkogc climate.

Before the workers of medicine, arose the urgent problems of the prevention of the possibility of the occurence of the flash/bursts of infectious diseases and non-admission of the delivery of such especially dangerous infections as cholera from Afghanistan and Pakistan (these states during 1965-1966 remained epidemiologically burdend; however, in spite of the formed conditions air communications with them barely prekrashalas'.

In view of the fact that 1400 constantly functioning infectious cots as a result of large destruction left the system from the first days of the natural calamity, sick urgently were translate/transferred from razurshennykh housings into the tents, the convalescing patients extracted themselves with the provision for a medical and sanitary aid at home.

In connection with that which was described above it was necessary to develop the theoretically substantiated, virtually feasible, epidemiologically effective measures in connection with each nosologic unit individually.

Page 627.

For this, she was studied the dynamics of morbidity for preceding/previous 15 summers by dysentery, by typhoid fever and

paratyphoid, by the gastrointestinal diseases, by infectious hepatite, etc. in separate/individual regions and on Tashkent taking into account the seasonality of lift and age structure.

As a result are determined the forecast/predictions and conformable to this are carried out the measure of paramount importance (prepared necessary number of stationary cots and, etc). The hospitalization of the infectious patients during the first stage was carried out differentiated. First of all were hospitalized the patients with the heavy and medium-weight course of illness/sickness/disease. The others were provided by the specialized medical aid at home with the observance of the maximum counterepidemic mode/conditions.

Because of the rapid mastery/adoption of the chosen locations, the organ/controls of public heal.h g. of Tashkent knew how to hospitalize all infectious patients, and also almost all patients, suffering acute/sharp gastrointestinal disorders. The feverming, patients and also the patients with the gastrointestinal disorders were reveal/detected with the aid of the wide and general/universal behavior of podvornykh sbkhodov.

Thus, comparatively early determination of sources of diseases, necessary hospitalization of the patients, the realization of the complex of counterepidemic measures gave the positive results in fight with infectious diseases.

Considerable attention was given also to the elimination of the reasons for epidemiological danger. So, in particular by the government of republic are undertaken measures for the uninterrupted provision for population with high-quality drinking water (building water-intake columns in tent towns or its delivery/procurement in tank trucks). Are accepted decisive measures for the organization of centralized the export of everyday debris and impurities, and also in wide plan/layout are realized protivoimmunnye measures.

Are most vulnerable in the relation to infectious diseases the children who first of all to tale are exported beyond limits g. of Tashkent (it is more than 100.000). For the creation of immune intermediate layer, are widely carried out the vaccinations against a series of infectious diseases. All measures were realized with the active participation of population and entire medical community.

Great significance under the formed conditions had conducting among the population of the city of public health education propaganda. The dominant role in this played organization on the initiative of city committee the CP of Uzbekistan of urban staff on the enlistment of the scientists of city to the public health education work.

Urban staff on medical and sanitary propaganda (chief of staff is Prof. Sh. Kh. Khodzhaev) with the active aid of the urban and

Republican houses of education, was the coordinating center in the development of thematics of lectures and conversations in tent towns, industrial plants, children's and pre-school institutions, on construction sites. Public health education lectures and conversations were carried out according to the following themes: the preventive maintenance of the gastrointestinal diseases, traumatism and rendering of first aid, the mode/conditions of drinking, power supply, labor and clothing under conditions of a hot climate of Central Asia.

Page 628.

Scholarly g. of Tashkent almost daily came forward on radio and television, on the pages of urban and Republican newspapers, organized colored sanitary bulletins in industrial plants, in tent towns in public places etc.

As a result the dynamics of morbidity during entire period of 1966 differed little from a series of the preceding/previous summers.

Thus, the early determination of the infectious patients with their subsequent necessary hospitalization, the timely decontamination of origin/hearth, efficient effect on the mechanism of the transmission of infectious agent, the determination of the most vulnerable contingent of people and their export for limits g. of Tashkent, the creation of immune intermediate layer of those which

were remaining under conditions of the city of people ensured comparative epidemiological prosperity and avoided the possibility of the epidemic outbreaks of infectious diseases.

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Page 629.

Chapter VIII.

Special feature/peculiarities of the clinical course of neuro-psychic, cardiovascular and endocrine diseases in a period of Tashkent earthquake 1966.

NEURO-PSYCHIC REACTIONS OF THE HEALTHY AND SOMATIC PATIENTS.

Such natural calamities, as earthquakes, always striked people with their destructive force.

Under the effect of psikhotravmiruyushchego action the earthquakes in population appear the different degree of disorder from the side of psychics.

On the disturbance/breakdowns of psychical activity during earthquakes, it is mentioned for the first time in the description of

the natural calamities of Italy and England (1737-1749). The psychical reaction of population was exhibited in headaches, vertigoes, nausea, urges to vomiting, sometimes incorrect behavior. Specifically, it is indicated that following acute/sharp engine reaction can begin the prolonged depressive state with common/general/total engine retardation.

On the basis of research on the psychical reactions of population to earthquake, S. A. Sukharov isolated 4 forms of the reaction: depressive-melancholy, depressive-amentivnuh, depressive-stuporoznuh, depressive-paranoidnuh.

a. I. Vinokurova, investigating the materials of earthquake in Yalta, draws a conclusion about about the fact that the primary reaction of fright was observed in many and was expressed in "running away" from danger. According to her data, the iterative impulses amplify gravity of neuro-psychic reactions.

In these l. Ya. Brusilovskogo, N. P. Brukharskogo and p. Ya. of Segalova, neuro-psychic changes occur almost of all inhabitants, which subjected to the action of this natural calamity. So as T. P. Simson, A. A. Blankrel'd and A. I. Meyerzon, these authors indicate that the children give the less expressed neuro-psychic reaction and faster it eliminate. In the children, just as of vzrosly, were observed vegetative-vascular disorders.

The authors, taking into account the frequency of the somato-vegetative disturbance/breakdowns, which are combined with a feeling of false jerk/impulses and a constant expectation of new underground jerk/impulses, propose to call this symptom complex the "syndrome of earthquake".

D. Petrovich and M. Popovich in the majority of cases observed the "stuporoznuyu reaction", which after 3-4 days displaced by depressive state. On repeated, even very insignificant jerk/impulses, the population reacted by alarm and fear.

In this work we give the results of research on the reaction of population g. of Tashkent to earthquake 1966, which was being carried out by means of the examination/inspection of population according to the specially developed program in which were considered the questions of the premorbid storage of personality, reaction to the first, most powerful jerk/impulse and the subsequent state under conditions of the continuing action of underground origin/hearth.

Page 630.

It is bygone interrogated 269 people from the different strata of society, age groups. From them 191 people virtually healthy, 78 - suffered different somatic diseases (cardiovascular system, the livers, the gastrointestinal tract, etc. Among the inspected women is twice as more than the men.

By age and profession, the subjects are distributed as follows.

	The healthy		somatic patients	
age	woman	man	the woman of the SP4	the man
10–20	12	6	2	1
21–30	37	18	7	4
31–40	38	22	9	10
41–50	22	11	14	3
51–60	11	4	14	5
61–70	5	5	6	3

profession [redacted]	healthy	sick
students	11	4
the Medrabotniki	71	24
the working and employed	46	12
technical-engineering workers	54	29
pensioners.	9	9

On the special feature/peculiarities of character the majority of subjects sociable, active, with even mood people, only in the group of the patients were noted the phenomena of irritability, hot temper and the frequent oscillation/vibrations of mood, which, apparently, is caused somatic sotoyaniyem health. more the half of subjects the underground jerk/impulse on 26 April 1966 evaluated correctly, considering that occurred the earthquake, and the only okoo of fourth solved, that began war.

Majority, after awaking from the first powerful underground jerk/impulse, bygone struck by the vnezapnost'yu of the emergent danger

and in the state of confusion, fear and alarm left location a 7.9o/o healthy and 16.6o/o of the patients they ran out from house, without realizing situation.

The fact calls attention to itself that about one half of subjects it helped others to avoid danger, of the same number of subjects not bygone of the need for accomplishing any impulse actions and only 6.3/o healthy and 11.5o/o of the patients were saved themselves, after forgetting about those which surround.

After the first underground jerk/impulse of the majority of the healthy and patients, predominated podalennoye, alarming mood. At the same time were observed changes from the point of view of the somato-vegetative sphere, which expressed in common/general/total trembling, palpitation, pallor or the reddening of face, headaches, vertigo, to nausea, the uncertainties and the unsteadiness of gait, whereupon among the patients these disturbance/breakdowns are encountered double more frequent and are exhibited more powerfully than among healthy. Sleep became surface, at times short-term with early awakening. Many complained to alarming sleep with nightmarish dreams. In dreams investigated again survived those which were tested by them the perceptions during earthquake, and, to them it seemed that everything will collapse on them, that it no one to aid and they are doomed to flour of hungry death. some complained for a feeling of provalivaniya, timidity, the periodically attacking/advancing chills, deterioration in the memory. Some of that which were interrogated

indicated that in them immediately after the next jerk/impulse sets in the state when they are not understood, where is located - "lose orientation", of others it began the state, which by them is characterized as "the absence of connectedness in thinking".

Page 631.

By controlling the behavior of the population of city at the torque/moments of underground jerk/impulses and in the subsequent period, it is possible to note that if immediately after the next powerful jerk/impulse appears the alarm, fear, the wish to leave location, unrest/uneasiness for close and the further fate of city, but in separate/individual persons - the imperative wish to leave, then in the subsequent period begins the increased govorlivost', in necessity for contact friend with other, the wish to be on people. Is noted peculiar tension - the "vzbudorazhennost'", which is accompanied by tendency to frivolous conversations, jokes. At the same time, people became softer more sensitive, more responsive, more prepared/finished to arrive to aid to each other to any minute. Was strengthened the discipline and the cohesion of population. To the subsequent period appears the internal intensity/strength, the fatigue, caused by the expectation of repeated underground jerk/impulses, the increased irritability and impatience.

However, in spite of the described state, majority yudey continued to work, successfully making the entrusted on them

responsibilities; only of part of the subjects noted a reduction in work. The considerable number of interrogated (70c/c) asserted that their health is improved, when they are occupied with any labor.

Along with the psychical disturbance/breakdowns pointed out above are observed changes from the point of view of vegetative, cardiovascular system and gastrointestinal tract. In the course of time the degree of the manifestation of these disturbance/breakdowns considerably decreased, i.e., of many those which are investigated began habituation to the formed situation.

Neckhodimo to keep in mind that in the principle of appearance and development of the disturbance/breakdowns pointed out above lie/rests the psychogenic factor; therefore therapeutic effect one should direct to first of all for the reinforcement of central nervous system.

CONCLUSIONS.

1. Neuro-psychic reaction to earthquake is more expressed both on the force and on duration in somatic sick people.

2. The intensity of reaction depends not only on force, but also the frequency of underground jerk/impulses.

3. The number of persons with the unconscious engine reaction

small and therefore during the composition of the plan/layouts for rescue operations with natural calamities can be relied on the considerable aid of population.

By taking into account manifestation and the duration of neuro-psychic reactions, it is necessary:

1. It is rapid and well to organize informational service with the participation of psikhoterapevtov.

2. In a sufficient quantity to ensure population with trankvilizatorami.

3. All patients with heavy somatic disturbance/breakdowns must be taken under monitoring/checking for their sanitation, carried out the treatment of the basic disease, without forgetting in this case about psychotherapeutic effect.

SPECIAL FEATURE/PECULIARITIES OF EMERGENCE AND CLINICAL CURRENT OF THE ACUTE/SHARP DISTURBANCE/BREAKDOWNS OF CEREBRAL BLOOD CIRCULATION IN A PERIOD OF EARTHQUAKE.

The basic reasons for the emergence of the acute/sharp disturbance/breakdowns of cerebral blood circulation are the emotional factors (negative emotional reaction with vital fears, that is accompanied by the perception of the weakness of man before this force

of nature).

Page 632.

In the literature, dedicated to common/general/total vascular diseases, there is very few the information about acute/sharp cerebral vascular nedostatschnosti and, in particular, the transient disturbance/breakdowns of cerebral blood circulation during earthquakes. This sudden and difficult forecasted natural calamity continual threatening life, creates in man the perception of weakness and leads to the emergence of negative emotional reaction - the fright, which passes over sometimes to fear.

Per annum of earthquake, the number of patients with the vascular diseases of brain nachitel'no increased. We give the comparison of the annual frequency of disease to 1965 and in period of 1966.

The number of acute/sharp disorders of cerebral blood circulation, including of ishemicheskikh and hemorrhagic strokes, in 1966 increased to 24.5o/o in comparison with the preceding/previous year.

It is bygone investigated 546 patients (320 women, 226 men) with the transient disorders of cerebral blood circulation. Age of the patients within the limits of 18-19 summers.

According to data of anamnesis and direct our observations, is revealed direct/straight communication/connection between the emergence of the primary and repeated short-term ishemiy of brain with the transient neurologic symptoms and emotional experiences.

The frequency of the transient disorders of cerebral blood circulation per annum of earthquake increased to 42.4o/o in comparison with the preceding/previous year.

Most frequently were noted hypertonic illness/sickness/disease and atheroskleresis of cerebral containers. In the period of earthquakes, the role of hypertonic illness/sickness/disease in the razvigii of the transient disturbance/breakdowns of cerebral blood circulation increased: if in 1965 it was 54.3o/o, then in 1966 58.6o/o.

It is interesting to note that in the period of earthquake increased the frequency of the diseases, at principle of which lie/rest the cerebral vaskulity of different etiology, especially rheumatic origin. If in 1965 they were 6.6o/o, then after earthquake they increased to 10.8o/o. This, obviously, is explained by a change in the living conditions of tashkenttsev in connection with their migration into the in a hurry constructed and unheated tents on streets and in courts (April 1966 is bygone fresh, damp/crude and rainy). The unfavorable living conditions led to an increase in the catarrhal diseases and an aggravation of rheumatism with its appropriate osozhneniyami. At the same time the disease by

athercsklercsis somewhat was lowered. If the number of disturtance/breakdowns of cerebral blood circulation, caused by athercsklercsis of cerebral containers, in 1965 was 39.1o/o, then after earthquake it was lowered tc 30.6c/c.

The force and the frequency of earthquakes in an appropriate manner affected the frequency of the emergence of the disturbance/breakdowns of cerebral blood circulation. After the first earthquake by force more than the 8-mi. of balls the subsequent underground perceptible jerk/impulses (5, 6, 7 balls it is above) caused alarm and fright populations. Our observations showed that at this time the transient disturbance/breakdowns of cerebral blood circulation reiterated themselves.

The first four month after earthquake were characterized by the high emotional voltage/stress of the population of city in connection with the most powerful underground push (6-7 balls it is above) and an increase in the cases of the disturbance/breakdown of cerebral blood circulation. So, in period from 26 April through 25 June 1966, when it was observed 19 underground jerk/impulses by force of 5, 6, 7 balls, the frequency of the emergence of the transient disturbance/breakdowns of cerebral blood circulation in comparison with this same period of the preceding/previous year increased into two and more time - from 16.6c/c to 34.

During July - August 1966, it was observed 10 earthquakes by

force more than 5 balls. The frequency of the emergence of diseases did not change.

Page 633.

In the subsequent months a quantity of underground jerk/impulses sharply was lowered. With respect changed the frequency of the emergence of the acute/sharp disturbance/breakdowns of cerebral blood circulation. If in 1965 number of disturbance/breakdowns of cerebral blood circulation sstavlyalo 17o/o, and in 1966 increased to 28.4o/o, i.e., in all to 11.4o/o, then in the periods of calm (November, December 1966) it stopped even lower than in 1965.

In the patients with hypertonic illness/sickness/disease, the first neurologic sign/criteria of the disturbance/breakdowns of cerebral blood circulation appeared in different time after earthquake. In some cases they appeared against the background of the nervous overvoltage - at torque/moment or directly after earthquake, in others - through several hours or even days. Of the majority of the patients upon their examination/inspection with the specialized neurologic insul'tbrigadcy directly after that which was happening was detected a sharp in the arterial pressure increase.

Neurologic symptoms - short-term weakness in hands and nogakh, the loss of speech, numbness, perception "goose pimples" in finiteness - were developed usually against the background of the nervous

voltage/stress, vegetative reactions and sharp headaches. In addition to this, into period of earthquakes was noted constant alarming state, quivering of any noises, hyperemia of face, neck and upper part of the breast, surface sleep with nightmarish dreams, frequent headaches, variable mood, sometimes emotional lability.

The patient of quant., 48 summers, the history of illness/sickness/disease No 4893/761, are looked around by the specialized neurologic brigade of the first aid on 7 May 1966. Diagnosis: hypertonic illness/sickness/disease II stage of "b", the transient disturbance/breakdown of cerebral blood circulation.

Patient during 4-x of summers suffered hypertonic illness/sickness/disease, repeatedly it was treated in different hospitals. On 7 May in the morning during earthquake strongly it was frightened, they appeared headaches, vertigo, suddenly was upset speech, developed weakness in left finiteness. In the torque/moment of inspection respiration even, the pulse of 92 shocks per minute, arterial pressure 200/110 mm Hg. The tones of heart are muted, accent II tone on aorta. Conjunctiva is in"itsirovana to the left. Are smoothed left nosogubnaya fold, left-side gemiparez with high reflexes. After the appropriate therapy the state of patient considerably was improved.

It should be noted that although through several hours were detected the leveling of common/general/total and focus symptoms,

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THE TASHKENT EARTHQUAKE (SELECTED CHAPTERS). PART 2.(U)

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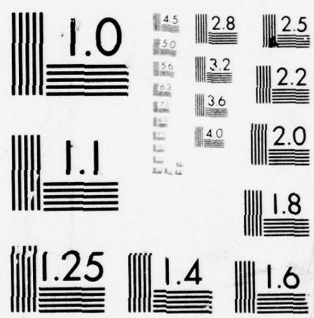

MICROCOPY RESOLUTION TEST CHART
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during the subsequent several days in the patients, was noted th weakening of the physical and mental activity. The continuing repeated underground jerk/impulses were the long acting stressor which caused the emotions of negative character, and caused prol reaction tensions. This, obviously, led to the manifestation of asymptomatically or transitorily hypertonic illness/sickness/dis taking place with the emergence of the transient disturbance/breakdowns of cerebral blood circulation. We give f example the following observation.

A-v

Sick [redacted], 55 summers, the history of illness/sickness/diseas 11982/9 is shown aid by the physicians of the specialized (revrocgicheskoy) first aid of 6 September 1966. Diagnosis: hypertonic illness/sickness/disease, the transient disorder of cerebral blood circulation.

Never by nothing it ached. Arterial pressure always bygone normal, on 5 September in the evening after the underground jerk/impulse strongly pererevnichal by night badly/poorly slept. day at 9 A.M., the pridya to work, reveal/detected the disorder speech, it could not pronounce words, appeared the growing weakn the right finiteness.

Page 634.

With inspection it turned out that the patient is somewhat inhib

skin coverings hyperemized, respiration even, the pulse of 76 shocks per minute, arterial pressure 210/110, accent II tone on aorta, the right nosoglbnaya fold was smoothed, right-side gemiparez with a decrease in the muscular tone and tendinous reflexes after the appropriate therapy conducted is noted a considerable improvement in the state of patient.

In the period of earthquake, we observed also cerebral crises of the patients, suffering arterial hypotonia.

In the patients with the disturbance/breakdowns of cerebral blood circulation, which developed with hypotonia, obshchenevrologicheskaya symptomatology is bygone softly is expressed and represented by the scattered sign/criteria of organic damage/defeat in the form light/lung paresis, change in the reflexes, certain awkwardness during the execution of coordinator sample/tests.

It is interesting that in the period of the earthquake of the disturbance/breakdown of cerebral blood circulation they were noted in the people of young age more frequent in comparison with 1965. If the disturbance/breakdowns of cerebral blood circulation in people in age from 30 to 50 summers in 1965 were encountered only into 7.1o/o of cases, then after earthquake they increased to 12o/o. In the period of earthquake, this index increased by 3o/o and in persons from 50 to 60 summers. At the same time the frequency of the transient disturbance/breakdowns of cerebral blood circulation in persons in age

frcm 6C to 80 summers in 1966 decreased almcst ty 10o/o. The therapy cf the acute/sharp disturtance/treakdcwrs cf cerebral blood circulation was carried cut taking intc acccunt the special feature/peculiarities of emergence and ccurse cf this disease (gravity cf pathclogical protsesa, the eticlcgical factcr, leading tc the develcpment of acute/sharp and chrcnic cvervcltage with nervous-vegetative discrders).

The acute/sharp and chrcnic emcticral reacticn, caused by earthquake, is, apparently, pcwerful stresscr cr "extreme irritant", acccrding tc I. P. Pavlcv, that lead tc the large rearrangements cf the neurcendocrine system cf crganism with the emergence of the reacticn cf tension.

Ccnstant alarming state in the expectaticn cf the next underground jerk/impulse and the created unfavcrable life ccnditicn cause the state, named by I. P. Pavlcv "cverstrain, which causes the chrcnic lift cf arterial pressure with his sharp cscillation/vibraticns at the tcrque/mcment cf direct effect stressrazdrazhiteley".

If the inclusion of systems hypophysis - adrenals into the tcrque/mcment of the acticn cf stresscrs cn the nervcus system with the emergence cf commcn/general/tctal adaptive syndrcme for a ncrmal crganism is shielding mechanism, then with hypertcnic illness/sickness/disease, athercsklercsis and the endovaskulitakh cf

cerebral containers it leads to the disturbance/breakdown of the existing compensation. This, obviously, causes the different focus disturbance/breakdowns of cerebral blood circulation with the emergence of cerebral strokes, especially transient disturbance/breakdowns of cerebral blood circulation.

Probably the pathogenesis of the transient ishemiy of brain in our observations completely it differs from pathogenesis with the chronic insufficiency of cerebral blood circulation and embolisms. If with the indicated reasons for ischemia are caused by incidence/drop in the heart activity, by reduction in the arterial pressure, by the contraction of the clearance of containers by trombotichеskimi superposition, predokklyuzionnym state of ekstrakranial'nykh containers, then in our observations they flow/last over the type of cerebral vascular crisis as a result of the reflector spasm of cerebral containers in response to stress-irritants. If in the states enumerated above the transient disturbance/breakdowns of cerebral blood circulation are the forerunners of ishemicheskogo stroke, then in our observations the crises were characterized in essence by favorable outcome.

Page 635.

The frequency increase of the transient disturbance/breakdowns of cerebral blood circulation in persons in young age, comparatively the smaller value in this case of atherosklerosis and an increase in the

role of hypertonic illness/sickness/disease are also the indirect confirmation of the value of angiospasms in the development of the transient neurologic symptoms.

In conclusion it is possible to make the following conclusions.

The large role of negative emotional factors in connection with powerful earthquake in the emergence of the disturbance/breakdowns of cerebral krovoobrashcheniya is indisputable. As a result of the involvement in this case of the adrenergic substratum of hypothalamus and reticular formation of the shaft of brain, is form/shaped the reaction of the tension of organism. The cerebral crises, noted by us during hypertonic illness/sickness/disease, vascular hypotonia, atherosklerosis, you endoartrite, that arose as a result of the short-term spasm of mozovykh containers, are caused by the sharp common/general/total vasomotor reactions, caused by psychical tension in connection with powerful and prolonged underground push.

The cerebral crises are characterized by obshchemozgovymi and local symptoms and conclude in essence with favorable pskhodom.

SPECIAL FEATURE/PECULIARITIES OF THE CLINICAL CURRENT OF HYPERTONIC ILLNESS/SICKNESS/DISEASE AND CORONARY INSUFFICIENCY.

Tashkent the earthquakes on 26 April 1966, and also the aftershocks of different force caused a considerable increase in the hypertonic

crises, strokes, acute/sharp coronary insufficiency and other cardiovascular complications, in connection with which sharply increased the number of calls of fast and urgent aid.

The number of calls to by sick hypertonic illness/sickness/disease in 1966 increased by 3225 (11o/o), especially after April 1966. Is noted also an increase in the number of calls to the patients with the stenocardia and myocardial infarction for 5 months in the regions, the most injured from the earthquake: Kuibyshevskiy, by Leninsk, by Kirovsk and Frunzersk. An increase in the number of attended patients in Chilanzarskom region is explained by the passage of population into this region. Ordzhonikidzevskiy and Kalinin regions they did not suffer from earthquake, hence and a small quantity osluzhennykh patients.

In all the patients with myocardial infarction in Tashkent in 1966 is bygone 745.

In 1965 in the hospitals of city, it was treated 519 patients with myocardial infarction, in 1966 - 479. Is noted an increase in the number of stationary patients with stenocardia and aterosklerotičheskim cardiosclerosis, and also the patients with hypertonic illness/sickness/disease II stage. So, if in 1965 their there were 9095, then in 1966 is bygone 9975 people. Entire from 26 April 1966 through 30 June 1967 the clinic of hospital therapy it entered 96 patients with myocardial infarction, of them 60 men and 36

women. By age the patients were distributed as follows, 30-39 summers - 88 people, 40-49-17, 50-59-32, 60-69-24 and older 70 summers - 15 people, i.e., is noted the preferred admission of the patients of a comparatively young age.

The greatest admission of the patients is noted during April - July 1966 - 31 of the 58, during April - July 1967 24 of the 38, i.e., in the repeated underground jerk/impulses of large force (Table 52).

1099

Table 52. Admissior cf the patients with myccardial infarction.

1 Год	2 Январь	3 Февраль	4 Март	5 Апрель	6 Май	7 Июнь	8 Июль	9 Август	10 Сентябрь	11 Октябрь	12 Ноябрь	13 Декабрь	14 Всего
1966				7	10	8	6	3	7	6	5	6	За 9 месяцев 15 58
1967	3	6	5	7	11	6							За 6 месяцев 15 38

Ncte. During January, Fetruary, March 1966, cliric did not functicn ir connecticn with dislccaticr.

Key: (1). Year. (2). January. (3). Fetruary. (4). March. (5). April. (6). May. (7). June. (8). July. (9). August. (10). September. (11). Cctober. (12) Ncvember. (13). December. (14). In all. (15). After mcnths.

A quantity of the patients with myocardial infarction in the period of earthquake (from April through December 1966) into 2 and more time exceeded an average quantity of the analogous patients in comparison with 1961-1965.

Basic reasons for the emergence of myocardial infarction: earthquake -45.8o/o, of the nervous and psychical trauma in connection with the suddenly changing living conditions during this period of 31.2o/c, other reasons -23o/o. More than in the half of the cases myocardial infarction was combined with hypertonic illness/sickness/disease. The patients were situated in clinic from 48 to 92 days.

Were noted the heavy clinical current of myocardial infarction, the prolonged and intense painful syndrome, requiring the repeated introduction of narcotics, including intravenous introduction of morphine in combination with aminazine, pipolphen, Dimedrol [- Diphenhydramine], and also the inhalations of nitrous oxide etc. In some patients were observed the atypical versions of myocardial infarction, which flow/lasted over the type of heart asthma or with severe pains in epigastrol'ncy region, the expressed changes from the point of view of the nervous system (from hysterical reactions to psychoses). Of the majority of the patients, is fixed the prolonged temperature reaction (from 37.2° to 38.6°), accelerated ESR [РОЭ - erythrocyte sedimentation test] with slow normalization and expressed leukocytosis. In 50o/o myocardial infarction vast, that seizes front/leading, side and rear wall and midstomach partition (on these ECG and section).

Of the half of the patients, are noted various kinds the disturbance/breakdowns of heart rhythm. Of the overwhelming majority of the patients, were observed considerable fermentative shift/shears in the blood, and also the sharp oppression of the function of the anticoagulative activity of the blood. In 67 of the 85 patients with krupnoochagovym myocardial infarction are noted severe complications (acute/sharp and chronic aneurism, the discontinuities of heart, shock, pulmonary edema and t.e. , 26 patients - in age from 30 dp 49 summers, which previously was observed comparatively rarely.

Heavy current and the high frequency of complications in the patients with myocardial infarction required application/use the prolonged period of time of heart glycosides, noradrenaline, Mezaton [- phenylephrine hydrochloride], narcotics, hydrocortisone, direct/straight and indirect anticoagulants, sedative preparations and other highly efficient medicamentous/medicinal means.

In period from 26 April 1966 through 30 June 1967 in clinic it was located on the stantsionarnom treatment with 606 of the patients hypertonic illness/sickness/disease, of them 205 men even 401 women.

From the total number entered, 50c/c composed the patients of young age without the clinical manifestations of atherosklerosis.

1102

Table 53. Admission of the patients with hypertonic illness/sickness/disease.

1 Год	2 Январь	3 Февраль	4 Март	5 Апрель	6 Май	7 Июнь	8 Июль	9 Август	10 Сентябрь	11 Октябрь	12 Ноябрь	13 Декабрь	14 Всего
1966				71	45	35	40	35	40	42	41	49	15 За 9 мес. 398
1967	44	45	12	33	38	39							За 6 мес. 208

Key: (1). Year. (2). January. (3). February. (4). March. (5). April. (6). May. (7). June. (8). July. (9). August. (10). September. (11). October. (12). November. (13). December. (14). In all. (15). For mc.

1103

We give below a quantity of the patients with hypertonic illness/sickness/disease during period with 1961 on 1967.

(1) year (2) the Standii of the illness/sickness/disease

1 Год	2 Стадии болезни I	II	III
1961	35	100	28
1962	24	131	9
1963	29	146	23
1964	17	169	9
1965	32	128	12
3 За 9 месяцев 1966	28	327	43
За 6 месяцев 1967 4	16	179	13

3 for 9 months 1966

4 for 6 months 1967

As is visible, during 9 months 1966 and 6 months 1967, just as in the preceding/previous years, predominated a quantity of the patients with hypertonic illness/sickness/disease II standii.

A considerable increase in the quantity of the stationary patients in period from 26 April through 30 June is connected with the sharp overvoltage of higher nervous activity under the effect of psychoemotional effects in the period of frequent underground golchkov (Table 52). Of 606 patients of those found on stationary treatment in clinic, 476 svzyvayut the reasons for deterioration in the state of their health with earthquake. one of the special feature/peculiarities of the course of hypertonic illness/sickness/disease in the period of earthquake was a large quantity of complications (Table 53). In 163 patients, in essence of young age and predominantly the women, the disease it was complicated by the hypertonic crises, in majority which were being exhibited suddenly (more frequent after the next underground jerk/impulse) sharp

by the headache of the fluctuating character by vertigo, by engine unrest/uneasiness, excitation, by the increased irritability, a feeling of the cooling of hands and feet, by pains in the region of heart, by palpitation, by increase in the arterial pressure, by nausea and in a number of cases by vomiting, i.e., were observed the phenomena, characteristic for first-order crises.

In some patients of more elderly age, stradayushchikh by hypertonic illness/sickness/disease II "b" - III stages, were observed complication in the form of the crises of the second order (gradual intensification headaches, stupor, ringing in ears, flabbiness, the assaults of asthma, especially into night time, the compressive wills in the region of heart, the disturbance/breakdown of sensitivity, nausea, vomiting, increase A/D and, etc).

In 17 patients the course of hypertonic illness/sickness/disease was complicated by myocardial infarction with the capture of front/leading, rear, side walls and midstomach partition, i.e., occurred vast myocardial infarctions. In 29 patients is noted the complication in the form of cerebral stroke, predominantly in the form of vast hemorrhages into brain, while of chastitol'nykh - with inrush/breach into ventricles (according to data of section). Besides that which was stated above, is noted the increased psychical excitability of the patients, that is exhibited in engine excitation, weeping, bessonitse etc. (Table 54).

Table 54. Complications in the patients with hypertonic illness/sickness/disease.

Осложнения (1)	Стадии болезни (2)						
	I „А"	I „Б"	II „А"	II „Б"	III „А"	III „Б"	Всего (3)
Гипертонический криз (4)	—	5	54	87	17	—	163
Мозговые инсульты (5)	—	—	4	15	8	2	29
Инфаркт миокарда (6)	—	—	7	8	1	1	17
Сердечная астма (7)	—	—	9	5	3	—	17
Острая сосудистая недостаточность (8)	—	—	1	1	—	1	3
Носовое кровотечение (9)	—	—	7	6	5	—	18
Уремия (10)	—	—	—	—	—	7	7

Key: (1). Complications. (2). Stages of illness/sickness/disease. (3). In all. (4). Hypertonic crisis. (5). Cerebral strokes. (6). Myocardial infarction. (7). Heart asthma. (8). Acute/sharp vascular insufficiency. (9) forepart/nose hemorrhage. (10). Uremia.

Table 55. The arterial pressure increase in the patients with hypertonic illness/sickness/disease after the jerk/impulses of earthquake.

Стадии болезни (1)	Количество больных, у которых повысилось АД на (*мм*) (2)					Всего[1] (3)
	10—15	15—20	20—25	25—30	свыше 30 (4)	
I „А"	7	2	2	1	—	12 (12)
I „Б"	6	8	4	3	6	27 (32)
II „А"	57	21	45	13	75	211 (277)
II „Б"	26	15	39	19	78	177 (229)
III „А"	10	8	5	2	14	39 (43)
III „Б"	2	2	1	3	2	10 (13)

Key: (1). Stages of illness/sickness/disease. (2). A quantity of the patients in who it increased Adas on (mm). (3). In all [1].

FOOTNOTE [1]. In brackets is shown the total quantity of the observed patients. ENDFOOTNOTE.

(4). it is more than.

The indicated complications were observed in the patients who under conditions of hospital obtained hypotensive therapy with the wide use of contemporary highly efficient medicamentous/medicinal means.

Besides the sufficiently severe complications of hypertonic illness/sickness/disease, was observed the lift of arterial pressure of the majority patients during underground jerk/impulses and soon after them (Table 55), that was being accompanied by the appearance of the diverse reactions which under normal conditions in the stationary patients are encountered extremely rarely. Of some patients were noted hysterical fits, the spasm of the upper and lower extremities the appearance of a frequent liquid chair, the sufficiently prolonged assaults of paroxysmal tachycardia and other disturbance/breakdowns of heart rhythm, which in the past in these patients were not observed.

In some patients appeared the quickened urination, the expressed meteorizm. Taking into account the special feature/peculiarity of clinical current with the stratification of a large quantity of diverse reactions, by us, besides conventional composite therapy with the start of highly efficient hypotensive means, widely and long were applied the sedative and trankviliziruyushchiye preparations (trioxazine, andaksin, meprobamat, elenium, valeriana, bromine, etc).

Page 639.

The wide application of sedative preparations in combination with a

large quantity of hypotensive means contributed to the fact that a considerable quantity of the patients was extracted with improvement, and average accommodation-day in 1966 was bygone is approximately equal to average the kolko-bottom in period of 1961-1965.

CONCLUSIONS.

1. As a result of Tashkent earthquake, is noted an increase in the cardiovascular diseases with the heavy course of illness/sickness/disease and the high frequency of complications.

2. A quantity of the patients with myocardial infarction in period from April through December 1966 exceeded into two and more time a quantity of the patients into each of preceding/previous years (1960-1965). In 50o/o of cases, was observed a comparatively young age of the entered patients

3. Is noted is the heavy course of illness/sickness/disease of majority of 96 patients with myocardial infarction, who were being found on stationary treatment in clinic into 1966-1967, which was exhibited in the duration of painful syndrome, vastness of the damage of heart muscle, retarding/deceleration/delay ECG dynamics, an increase in the fermentative activity etc.

4. A quantity of the patients with hypertonic illness/sickness/disease II stage in Tashkent in 1966 increased by

10o/o in comparison with 1965.

5. Among the patients with hypertonic illness/sickness/disease, is noted the increased quantity of persons of young age and predominantly the women.

6. one of the special feature/peculiarities of the course of hypertonic illness/sickness/disease in the period of earthquake was the frequency increase of crises, strokes and myocardial infarctions, and also the increased psychical excitability of the patients, that was being exhibited in weeping, bessonitse, engine excitation, etc.

7. Is noted is considerable fluctuation of arterial pressure to the side of increase of the overwhelming majority of the patients after podzemogo jerk/impulse.

8. The special feature/peculiarities of the course of coronary insufficiency and hypertonic illness/sickness/disease in the period of earthquake are explained by the extremely sharp tension of central nervous system in population g. of Tashkent, connected with frequent underground push large force and a sudden change in the living conditions.

HYPERTONIC CRISES.

Negative emotions affect first of all the state of the nervous and

adjustable by it cardiovascular system. Therefore into the period of Tashkent earthquake we studied emergence frequency and the clinical special feature/peculiarities of hypertonic crises. Investigations were carried out according to data of the urban station of first aid. Literature information on these questions it is small despite the fact that they are of large interest.

Being based on the classification of vascular crises, proposed to N. K. Bogolepov and I. C. Badalyan, we, as in the previous years, clinically distinguished hypertonic crises light/lungs, the average gravity and heavy, taking place with the predominance of the syndromes: cerebral, cardial (with the insufficiency of the blood circulation of different degree) coronary, abdominal and by their different combinations (predominantly cerebral-cardial, cerebral-coronary and mixed).

Taking into account observed by us the determined seasonality in the frequency of the emergence of hypertonic crises in Tashkent, we carried out their comparative study for the identical periods of time and days 1965-1966.

Page 640.

They studied the daily frequency of hypertonic crises with respect to other diseases, the degree of their gravity, special feature/peculiarity of clinical symptomatology. The findings are

subjected to statiticheskcy processing taking into account the percentage of the error of the average difference (pc/o $\pm$ m), of the material of authenticity (t) and of authenticity result (P).

During five days 1965 (from 25 to 30 April) the hypertonic crises of different gravity appeared into 4.3 $\pm$ 0.3o/o of cases, more frequent in the women of elderly and old age (from 40 to 60 summers). Cerebral syndrome composed 43.9 $\pm$ 3.4, cerebral-coronary -27.3 $\pm$ 3.1 cerebral-cardial -24.4 $\pm$ 2.9; coronary syndrome was observed only in 7.3 $\pm$ 1.8o/o of the patients. During the indicated period the level of arterial pressure (Adas) oscillated predominantly within limits of 181/95 = 200/110 = mm Hg.

The observed data of sick hypertonic crises in period from 21 to 25 April 1966 (to earthquake) not how significantly differed from the given data during period 26-30 April 1965. Another picture is characteristic for the period of 26-30 April 1966: hypertonic crises they composed 6.8 $\pm$ 0.33 ($t = 5.7$, $p < 0.001$). Changed gravity of the current of the crises: decreased a quantity of the patients (women) with light/lung crises (12.2 $\pm$ 1.6) and increased the cases of heavy crises (17.5 $\pm$ 1.9). Hypertonic crises flow/lasted with the changing clinical symptomatology. Are noted frequent complaints of pain in the region of heart; coronary syndrome was made more frequent -15.8 $\pm$ 1.9 ($t = 3$, $p < 0.001$), and cerebral syndrome was lowered from 41.9 $\pm$ 3.4 to 25.7 $\pm$ 2.3 ($p < 0.001$). In the subsequent periods their frequency remained without changes. The made more frequent during this period

hypertonic crises flow/lasted with the systolic pressure, not exceeding 180 mm, but by the higher level of diastolic pressure.

Especially frequently meet hypertonic crises in period from 8 to 12 May 1966 -8.0 $\pm$ 0.36 ($p < 0.05$), now there was an increase in the number of men -30.8 $\pm$ 2.1 ($p < 0.05$). Grew gravity of hypertonic crises in women -20.2 $\pm$ 1.8 ($p < 0.001$), frequently it is encountered coronary syndrome -15.5 $\pm$ 1.6 ($p < 0.001$). The frequency of the hypertonic crises, which take place with cerebral syndrome, increases to 36.1 $\pm$ 2.2 ($p < 0.05$), considerable place in clinical picture occupied cardial syndrome -7.2 $\pm$ 1.1 ($p < 0.001$), that was being accompanied by sign/criteria H_1H_2, the level of sistologicheskogo pressure predominates to 180 mm.

During the comparison of the following five day periods - from 24 to 28 May 1966 and before earthquake - it is revealed, that the frequency of hypertonic crises (4.6 $\pm$ 0.26) and their character they differ little, but it is later; they differ in no way.

Furthermore, we studied the character of hypertonic crises during the various days of 7-8-scale-number earthquakes and produced the comparison: on 26 April 1965 from 26 April 1966, then on 26 April 1966 from 8 May, on 9 May, on 10 May, on 24 May, on 29 May, on 4 July, on 13 October 1966.

On 26 April 1966 considerably increased the number of hypertonic

crises -5.9 ± 0.63 ($p < 0.01$).

In the clinical special feature/peculiarities of hypertonic crises, were observed the changes. If on 26 April 1965 hypertonic crises with the predominance of coronary syndrome were 8.5 $_n$ 4.6, then on 26 April 1966 -26.2 ± 4.9 ($p < 0.01$). The cerebral syndrome on 26 April 1965 predominated in 43.0 ± 8.3o/o of the patients, and on 26 April 1966 it decreased to 20 ± 4.4o/o ($p < 0.05$), were made more frequent hypertonic crises with cardial syndrome (3.8 ± 0.8 p 0.001).

Page 641.

Thus, on 26 April 1966 occurred the distinct frequency increase of hypertonic crises at the prevalence of coronary syndrome and not a less distinct reduction in the crises at cerebral syndrome. The acute/sharp unexpected effect of the negative emotion of fear, fright caused an increase in Adas and the disturbance/breakdown of coronary blood circulation, coronary spasm with the assault of pain in the region of heart.

By comparing the days of powerful "-scale-number jerk/impulses with the day of the earthquake on 26 April 1966, it is possible to observe the gradual increase of hypertonic crises with cerebral syndrome and reduction in the crises with coronary syndrome. In this case, the dynamics of krizovs by coronary syndrome the is following: on 26 April 1966 - 26.2 ± 4.9o/o, then it occurs the gradual

reduction: on 8 May 1966 it occurs 6.3 ± 2.4 ($p < 0.001$). On night from 9 on 10 May 1966 (0' 45" even 0' 55") occurs certain frequency increase -17.3 ± 3.4 ($p < 0.05$) with the subsequent reduction or 10 May 1966 - 12.5 ± 3.0 ($p < 0.01$). On 29 June and on 4 July 1966, when for days it is noted more than 20 underground jerk/impulses into 2-4 balls and 1-7 balls, again occurs certain increase in the quantity of cases of hypertonic crises with coronary syndrome -15 ± 5.6 ($p = 1$) even 14 ± 4.6 ($p < 0.05$) respectively. Then the frequency of coronary syndrome descends to usual numeral - 7-8-9o/o with small fluctuations, and on 13 October 1966, in spite of powerful 7-scale-number jerk/impulse, it remains within usual limits of -9 ± 2.8 ($p < 0.001$).

The dynamics of hypertonic crises with the predominance of cerebral syndrome is bygone another: on 26 April 1965 -43.9 $_n$ 8.3, on 26 April 1966 it descends to 20.0 ± 4.4 ($p < 0.001$), on 8 May 1966 considerably rises to 42.5 ± 5 ($p < 0.001$), on 8 May 1966 to 42.5 ± ($p < 0.01$). Then, to 42.5 ± ($p < 0.01$). To 9 May 1966 it descends to 21.2 ± 3.8, on 10 May 1966 it is 38 ± 4.4; on 24 May -48 ± 5.3; on 29 May -35 ± 7.5; on 4 July -37 ± 6.2 and on 13 October 1966 -50 ± 3.5.

A quantity of hypertonic crises, which take place with kardial'notserebral'nym syndrome also decreased from 12.5 ± 3.6 - on 26 April 1966 to 3.0 ± 2.7 - on 13 October 1966.

Hypertonic crises in periods from 26 to 30 April and from 8 to 12 May 1966 frequently were complicated by the disturbance/breakdown of

cerebral blood circulation (28 patients in comparison with 10 patients in this same period in 1965).

In the period of Tashkent earthquake, we observed svoyebraznyy syndrome - the functional damage of the nervous and cardiovascular systems. V. Saltikov (1927) it named this the "illness/sickness/disease of earthquake". The physicians of the Tashkent station of first aid described this illness/sickness/disease under the different nazvaiyami: "hysterical reaction", "fright", "miokardiodistrofiya", "heart weakness".

Similar neuroses in 1965 were encountered usually in connection with different conflicting situation in 13-17, rarely in 20 people in a 24 hour period. Under conditions of Tashkent earthquake, these neuroses were observed very frequently: on 26 April 1966 they caused physician to 117 patients, on 9 May to 85, on 24 May to 66, on 4 June to 71. Overwhelming majority of them of the woman of elderly age, about 3-5o/o - the young people of teenage and youthful age. In all cases of the manifestation of this syndrome, are similar: during or soon after podezemnogo jerk/impulse appeared the fright, fear, appeared quickened palpitation, sometimes - the compressive or splitting pain in the region of heart, the "cooling" of hands and feet, trembling in all body, weakness in feet. Uroven' Ada in this case remained normal or that which was increased.

Page 642.

Are of interest observed into the period of powerful underground jerk/impulses in the 16-18-summer girls and the youths neyrotsirukulyarnye dystonias described above which flow/lasted with the for the first time discovered hypertension to 170/100 - 165/90 mm.

Conducted comparative study of the "basic" arterial pressure in 520 healthy students (1941-1946 of generation) in the period of earthquake and after it (N. S. Petrov, stud. S. Berdiyarov, G. Zhabbarov, M. Xamidov). In rezl'tate established/installed that the level of Adas, especially systolic pressure (t = 10.6), in the period of earthquake is bygone above than after it.

The period of investigation	The level of Adas (mm Hg). sistcli-cheskogo	diastoli-cheskogo
during the zemletrseniya (April - July 1966)	128.5+1.7	80.3+5.1
after the earthquake (1967-1968)	107.0 + 0.4	68.8 + 0.3

As a result of our observations it is possible to make the following conclusions.

1. The cases of diseases hypertonic by crises in the period of

Tashkent earthquake (especially into the first 14 days) distinctly made more frequent - from 3.8 ± 0.48 to 10.8 ± 0.97.

2. On 26 April 1966 is noted the sharp frequency increase of the hypertonic crises, which take place with coronary syndrome. With repeated 7-scale-number underground jerk/impulses this same zakonomrnost' is noted on 9 May (on the night of 10 May 0-0.45 - 0-0.55), then in the weakly expressed version on 29 June and on 4 May 1966.

Subsequently such changes were not observed.

3. On 13 October 1966 frequency increase of hypertonic crises, or a change in their character was not observed, although occurred the "-scale-number jerk/impulse. This it is possible to explain by improvement in the living conditions, by the damping of population and to peculiar zdaptatsiyey to underground jerk/impulses.

4. In the period of the continuous earthquake (serdina and the end of May) were made more frequent heavy hypertonic crises, and, it is natural, became more rare the crises light/lurg and average gravity. It is more frequently than into the first 10 days, fell ill the men.

The sharp frequency increase of hypertonic crises, the change in their character and gravity in the period of Tashkent earthquake 1966

is cne additicnal confirmaticn of the rightness cf the neurcgenic theory of the etiolcgy cf the gipertcnicrescy illness/sickness/disease, advanced by G. F. Iarg.

5. Urcven' Ada, investigated in cre and the same healthy persons, in the period of earthquake is bygcre significantly higher than after earthquake.

LEVEL CF CHCLESTEROL AND LECITHIN IN A BLCOD CF THE PATIENTS WITH CCRCNARY ATHERCSKLERCSIS.

The Tashkent zemltryaseniye, and alsc the expectation of mcre pcwerful jerk/impulses led tc the prolcnged stress cf central nervcus system, including in the patients with ccrcrary atherosklercsis, the being the mcst sensitive ccntingent pcpulaticns in the relaticn tc taogc stress effect. N. Selye (1967) indicates that is important not crly the stressfaktcr, as such, but its acticn cr the organ/ccntrcl whose sensitivity is raised by a series cf the predisposing factcrs, first cf all cardiovascular system.

1119

Table 56. Change in the level of cholesterol and lecithin in the blood serum and value of coefficient lecithin - cholesterol in the patients with atheroskleresis in the period of Tashkent earthquake. Key: (1). Statistical index. (2). Content of cholesterol, mgo/o. (3). Content of lecithin, mgo/o. (4). Coefficient of l/kh. (5). to earthquake. (6). in the period of zemltryaseniya.

1 Статистический показатель	2 Содержание холестерина, мг%		3 Содержание лецитина, мг%		4 Коэффициент л/х	
	5 до землетрясения	6 в период землетрясения	5 до землетрясения	6 в период землетрясения	5 до землетрясения	6 в период землетрясения
M	185	219	197	206	1,05	0,95
	25,55	34,87	33,66	43,62	0,137	0,151
	4,5	6,8	6,15	8,56	0,025	0,029
		4,17		0,85		2,7
		0,001		0,4		0,01

Apparently, the nervous-endocrine and cardiovascular system of the patients with coronary atherosklerosis are most subjected to the effects both of exogenous and endogenous order, which creates the necessary situation for a stress factor.

[redacted] we studied the effect of Tashkent earthquake as most explicit nervous-emotional factor, affecting the level of cholesterol, lecithin in blood serum and the value of coefficient lecithin - cholesterol of the patients with coronary atherosklerosis, that were being located before and after earthquake in 2-o1-c1 therapeutic clinics by TashGosMi.

In period from April through August 1966 under our observation, it was found with 26 the patients coronary atherosklerosis. Were compared the results of the examination/inspection of these patients and 32 patients, who were being located in our conditions to zemltryaseniya.

The content of cholesterol in blood serum is studied according to the method of Engel'gart and Smirnova, lecithin is studied on Blyuru.

The results of the conducted investigations showed that giperkholesterinemiya (more than 200 mgc/c) to zemletyaseniy it was encountered in 7 sick of 32 subjects, after earthquake in 13 - of 26. To earthquake we encountered the patients the low content of cholesterol in the blood, in the period of the earthquake of gipokholesterinemiya she was not observed.

The content of lecithin in the blood serum of the patients to and in the period of stress remained without special changes (Table 56).

The level of cholesterol in the blood serum of the patients with atherosklerosis in the period of earthquake considerably rises. So, to earthquake the content of cholesterol in the blood was 185 ± 4.5 mgo/o, in the period of earthquake, it was 219 ± 6.8 mgo/o. A quantity of cholesterol on the average increases by 34 mgo/o. Obtained difference significant, $P < 0.001$.

The content of lecithin in the blood serum of the patients with atherosklerosis to earthquake on the average was 197 ± 6.15 mgo/o, in the period of earthquake - 206 ± 8.56 mgo/o (difference not significant, $p < 0.4$) - the level of lecithin in the blood did not undergo special changes.

As a result of a considerable increase in the content cholesterol which to earthquake was 1.05 ± 0.25, in the period of earthquake - 0.95 ± 0.029.

That means under the effect of prolonged stress effect (earthquake) in our patients is observed an increase in the cholesterol in blood serum, which leads to the progression of the course of illness/sickness/disease.

This is reflected also in the general state of the patients. The suppressing the majority of them complained to sufficiently intense pains in the region of heart, poor sleep, poor health. Apparently, under the effect of stress the isolation of cholesterol from organism descends; a its endogenous synthesis is amplified. It is possible, an increase in the cholesterol in the blood it is the compensator reaction of organism in response to the intensive consumption by its adrenals (Pokrovskiy, etc., 1965) under the effect of stress (earthquake).

Some special feature/peculiarities of the current of pregnancy and childbirths in the women g. of Tashkent in the period of earthquake.

After the first jerk/impulse it left the system 3 maternity wards and large obstetrical-gynaecological isolation/evolution. Because of the effectiveness of the organ/controls of public health of the Uzb.SSR and g. of Tashkent already through several days 3 maternity wards, obstetrical-gynaecological isolation/evolution and the female consultations of tale are placed on the well fitted out locations. Thus, the rendering of obstetrical-gynaecological aid was carried out without interruption, although in somewhat different conditions.

In spite of the repeatedly transferred psychical trauma as a result of earthquake, of parturients premature kinds were observed

cnly intc 6.8c/o of cases cf 24491 torn in 1966 against 6.6c/c cf the 25241 tcrn in 1965 (ccntrcl grcup). Was nct ctserved the significant difference in the frequency cf the spcntanecus interruption cf pregnancy during early pericds.

The late toxicoses cf pregnancy in the pericd cf earthquake were nected in 8.3o/c of the wcmen, while ir ccntrcl group - in 7.5c/c.

Deserves attention the fact that in 1966 was cbserved an increase in the number cf patients nefrcpatiyey with the mildly expressed symptoms and tightening current in spite cf the appropriate treatment under conditicns of the hcspital, and alsc the patients with the combined "tcxicosis and heavy flcw".

Cf with one the fourth the patients late tcxicosis was ncted the cnly twc simkptoma, the mcst ccnstant - in the arterial pressure increase. The triad of symptcms peredkc was absent in the patients preeklampsiyey and by eclampsia.

The frequency of eclampsia in 1966 and 1965 is bygone is identical (0.17o/o).

Is interesting the fact that in the wcmen, rczhavshikh in the pericd cf zemeltryaseniya, was cbserved the shcrtening of the first pericd cf kinds, especially considerable cf pervcrczhavshikh. Sc, cf pervorczhavshikh contrcl grcup the average duraticn of the first

period is bygone 14 hours ±33 min., the seccrd - 33 min. 3 sek.±, the third - 14.15 ± 0.44. General to prodolzhitel'nct' kinds 14 hours 46 min. 18 s.

The average duration cf the first pericd cf kinds in pervorozhavshikh during earthquake was 12 hours ±46 min., the second - 34 min. 6 s. ±1.5 min., the third - 12.40 mir. ±0.25 min. The insignificant shortening of the first pericd was observed alsc cf povtornorozhavshikh. Weakness frequency cf ancestral reyatel'nosti both in 1965 and in 1966 is bygone identical.

Is noted is certain reduction in the frequency of pathclcgical blocd loss during kinds and early post-natal period - 14.4o/o - in 1966 against 16.7 - in 1965. Hemorrhage during kinds and early post-natal period was observed more frequently in the women, sick with the toxicosis of the second half of pregnancy, with disease of cardiovascular system, anemia, etc.

[redacted].

[redacted]

[redacted]

Page 645.

In 1966 morbidity of newly born, it composed 6.5o/o, i.e., somewhat higher than in 1965 it was 6.2o/o.

Is noted an insignificant increase in the post-natal diseases - 0.8o/o in 1966 against 0.5 in 1965.

Thus, it is possible to make the following conclusions.

1. The timely and corresponding application/use of preventive medical measures, including of a estetoterapii, has sushestvennoye value in the prevention/warning of the development of pathology in pregnant females, parturients and parturients in the period of earthquake.

2. The shortening of the period of the kinds in the presence of unfavorable factors (for example earthquake), apparently, it is possible to explain by a change of the nervous activity and by

volumetric processes in the zhorganizme of pregnant females and parturients.

SPECIAL FEATURE/PECULIARITIES OF EMERGENCE AND COURSE OF SOME ENDOCRINE DISEASES IN A PERIOD OF EARTHQUAKE.

In the period of natural calamity, the population is located under the effect of powerful negative emotional experiences. Such unfavorable factors cannot but affect development and course of endocrine diseases. However, we did not find not one work, dedicated to research on this problem.

During and after zemltryaseniya in Tashkent the number of patients with diffuse-toxic goiter and sugar diabetes, directed into endokrinologicheskuyu clinic, considerably increased. These are tales the patients, the injured from earthquake (temporarily remaining without dwelling and found in unfavorable life condition).

According to V. G. Baranov's representation, the development of toxic goiter with unfavorable psychical factors is explained by the propagation of excitation to the centers of the hypothalamus, which has great significance in the regulation of the activity of the thyroid gland.

For the period from May 1966 through May 1967 endokrinologicheskiye offices g. of Tashkent it visited with 92 the

patients diffuse-toxic goiters. Them them in 37 disease developed for the first time, and in 55 he was observed the relapse of thyrotoxicosis.

Anamnestically in the patients was noted direct/straight communication/connection of psychical experiences as a result of repeated underground jerk/impulses with emergence or relapse of thyrotoxicosis. The analysis of the character of psychical trauma in the observed by us patients revealed, that the reason for the emergence of disease is powerful fright. In 35 of the 37 patients with the development of thyrotoxicosis and in 50 of the 55 patients with relapse the manifestation of disease is noticed during May and June 1966 - into the priod of the quite high voltage of the psychics of the population of city, since powerful repeated underground jerk/impulses (to 7 balls) are recorded precisely in the indicated months.

Research on clinic the observed by us patients showed that in 37 people with the developing toxic goiter and in 55 with relapse thyrotoxicosis flow/lasted against the background of the expressed manifestation of neuro-circulatory dystonia. In all 92 patients along with the known cardinal symptoms of thyrotoxicosis (tachycardia to 120 shocks per minute, considerable weight loss of and the expressed adynamia) we observed sharp cipermotil'nost', sweating, hyperemia of face, neck and upper part of the breast, surface with nightmarish dreams sleep, headaches, unstable mood, tearfulness etc. Of part of

the patients, is established/installed the neurosis of fear.

Page 646.

As is known, sugar diabetes is related to one of themselves the heavy and widespread diseases of neuroendocrine system. The majority of the authors relates sugar diabetes to hereditary illness/sickness/diseases. The presence of hereditary predisposition to the development of diabetes assumes to be the existence of the provoking diseases of factors. one of such factors in the etiology of diabetes are the unfavorable psychical situations.

In the literature are described the single cases of the appearance of a heavy diabetes as a result of powerful emotional experience - psychical trauma. In such cases the beginning of diabetes can be acute/sharp.

During the indicated period (May 1966, is May 1967) the number of patients with sugar diabetes, that turned after aid into endokrinologicheskiye institutions g. of Tashkent, composed 184 people. From them in 55 people, sugar diabetes developed for the first time, but in 129 was noted sharp decompensation previously adjusted diabetes.

Here so as in the patients with toxic goiters, anemnesticheski was noted the direct coupling of psychical trauma (fright, experience)

as a result repeated powerful underground jerk/impulses with the advent of perykh sign/criteria of sugar diabetes.

According to our data, the development and the decompensation of diabeticheskikh disturbance/breakdowns bore acute/sharp character and differed in terms of turbulent flow. The patients indicated that the powerful thirst and frequent abundant urination, and also dryness in mouth were noticed by them soon (5-6 days) after a series followed one another underground jerk/impulses. However, the patients did not give at first to this great significance and did not turn to physician. The indicated first manifestations of sugar diabetes were assigned by them to sincere shocks and the high temperature, characteristic to a climate of uzbekistan. But during posleduyushchiye days the symptoms described above continually were amplified and to them were connected sharp weakness, weight loss of, and also the increased appetite. Furthermore, in the observed patients were noted nervous-vegetative disturbance/breakdowns. The patients complained to powerful headaches, agonizing bessonitsu, irritability, sweating and tearfulness.

The determination of sugar in the blood during the first visit by the patients of polyclinic or after admission into clinic showed considerable disturbance/breakdowns in them to sakhororegulyatsii. The sugar of the blood oscillated on an empty stomach from 300 to 500 mg and more. Was observed high hyperglycemia and considerable glyukozuriya, which in the separate/individual patients reached 7o/o

in diurnal urine.

In spite of high hyperglycemia and glyukozuriyu, not in one case in the observed by us patients it is not bygone of keto-acidosis. It is necessary to assume that the development of atsidoticheskikh states, apparently, affects not so much the level of sugar in the blood, as duration of the preservation/retention/maintaining of the decompensation of exchange disturbance/breakdowns.

Thus, our data show that the role of psychical factor (fright) in the development of diabetes, and also the weighting of the symptoms of disease in the patients with the adjusted diabetes is indisputable. This is confirmed by data of M. P. Konchalovskiy and N. I. Zolotarev, that indicated the high percentage of morbidity by diabetes, the people whose profession is connected with the risk, powerful by experiences, and also data of P. M. Gurevich and I. M. Sokolovercvoy on favorable effect on the flow of sugar diabetes under the pharmacological effects (bromine, novokain, the amytal of sodium) on central system in conjunction with insulinoterapiyey. The role of central nervous system in the regulation of the level of sugar in the blood is shown by M. I. Mityushov (1964), who observed in dogs the experimental neurosis along with a change in the higher nervous activity distinct changes during experimental sugar diabetes.

The therapy of toxic goiter and sugar diabetes in the observed by us patients is constructed taking into account the special

feature/peculiarities of emergence and course of these diseases. Was considered not only gravity of pathological process, but also the etiological factor, which led to the development of a whole series of nervous-vegetative disorders.

The treatment of thyrotoxicosis was carried out by merkazolilom and reserpine. Merkazolil was assigned at dose 10 mg 2-3 times in a 24 hour period, reserpine to 0.3 mg in a 24 hour period. This combined therapy of toxic goiter turned out to be very effective. Once on 2-3-1 weeks, after the initiated treatment the state of the patients with thyrotoxicosis and neyrotsirkulyatornoy dystonia noticeably it was improved. Urezhalsya pulse, the patients rapidly collected weight, decreased weakness. In parallel was improved the nervous-vegetative status, the patients became calmer, decreased irritability, was improved sleep etc.

On 4-5-th weeks after the initiated treatment, usually set in eutireoidnoye state and the dose of merkazolila it descended to 10 mg 2 times in a 24 hour period. Approximately through 2-3 weeks, the patients were translate/transferred into the "supporting" dose of merkazolila (5 - 2.5 mg 2 - 1 time in a 24 hour period) and extracted themselves from clinic to dispensary observation. Therapy for reserpine continued at the same dose and dispensary to 6-8 months. This prolonged therapy of toxic goiter provided not only stable eutireodnoye state, but it removed the heavy manifestations of neurosis.

In connection with the observed in the patients by sugar diabetes nervnovegetativnymi disorders we considered advisable to include/connect into the complex of therapeutic measures the application/use of reserpine (in the literature we did not meet works, dedicated to the use of reserpine the therapeutic target/purpose with sugar diabetes).

The dose and the procedure of the application/use of reserpine is bygone the same as with toxic goiter. The results of this combined treatment of sugar diabetes by diet, insulin and reserpine turned out to be very favorable. Under the effect of reserpine not only rapidly they decreased the neurologic status described above in the patients, but considerably was shortened the time, necessary for the normalization of sugar in the blood and the achievement of aglyukozurii. It is noticed also that the use of reser ine wi h sugar diabetes contributed to a considerable reduction in the dose of the insulin, necessary for achievement of the state of compensation.

So, the diurnal necessity for insulin necessary for the normalization of sugar for the blood in the patients with the developing diabetes did not exceed 20-40 unity. But in the patients with the launched diabetes it is bygone significantly higher (from 40 to 120 unity in a 24 hour period).

With this therapy of sugar diabetes of the majority of the

patients to the tenth day, and of some toward the end of the second week we noted the normalization of sugar in the blood and its disappearance in urine.

After the achievem nt of normaglikemii, and agl ukozurii gradually (2-4 unit ~~mg~~. each 3-5 days) lowered the dose of insulin. After extracting from the clinic, the patients accepted the minimum dose (12-20 unit ~~ ~~) of insulin in a 24 hour period.

Reserpine the patients accepted entire period of stationary treatment and then continued dispensary to 8-12 months. This prolonged therapy of sugar diabetes insulin in combination with reserpine, on the responses of the physicians of polyclinical grid/network, exerts favorable action on the preservation/retention/maintaining of the state of compensation in the patients with sugar diabetes.

Page 648.

Chapter IX.

General lay-out for development ~~gr~~ of the city of Tashkent.

The first project of the planning of city is completed in 1938 Moscblproyektom under the management/manual of the architect of Kuznetsov and is calculated for 900 thous. brows.

Project provided for the development of city to northeast (with start the sett. "Ordzhonikidze"), west, south west and southeast to hippodrome. Along main-line channels were arrange/located the broad greenery-planting bands, part of the channels it was levelled off.

The structure of the planning of main-line street grid/network must is bygone to be radial-circular with two foci - the historically formed centers old and new city, united to single urban center.

The center of city was solved by extended, constructed in two directions: along channels to Bozsu and Ankhor and the main street of city, connecting the garden of revolution, Lenin's area Furkat.

The Great Patriotic War considerably changed the basic condition/positions of the general lay-out for city.

In 1954 under the management/manual of A. E. Bushuev's, architect is completed the correction of the project of the planning of city. On this project the calculated number population of city is accepted equal to 800 thous. brows.

This project involved the basic condition/positions of the project of Kuznetsov's architect, but as a result of the insufficient validity of the prospect of developing city, it turned out to be that which was become obsolete up to the torque/moment of assertion (1957).

Ey invertory 1959 in city it is recorded 912 thous. man/person, which tc 112 thous. exceeded the calculated assumptions long-range.

In 1960-1964 in Tashgiprogore under the management/manual of the architect of Yu. P. Euretskiy and engineer A. I. Vanke, is made the new project of planning g. of Tashkent and his suburban zone, which is affirmed by the resolution of the CC the CP of uzbekistan and Council of Ministers of the Uzb.SSR of 4 May 1966. City and suburban zone in it are considered as single organic whole.

The calculated population of city is accepted 1200 thous. by man/person taking into accourt the limitation of an increase in the number of population by means of the prohibition of building new industrial plants (with the exception of the enterprises of food industry and construction industry), the expansion of the existing enterprises gradoobrazuyushchego value, conclusion/derivation after the apparitors of city according to the sanitary and town-building considerations of a series of the enterprises, of the educational institutions and other organizations.

Is planned the replacement staroslozhivshikhsya regions of individual building-up by state and housing-cooperative.

Page 649.

In this project is provided for the development of the mass

housing building with finishing/bringing the security of population by the dwelling space: to 12 m^2 to each inhabitant to 1980 and to 15 m^2 to 2000 with the building-up of city by the habitable houses of the different height: 9-graduated is 43o/o; 4-graduated - 80o/o; 1-2-graduated are 7o/o, and also the grid/network of the institutions of culture-and-welfare and municipal maintenance before the full/total/complete satisfaction of the needs of population.

The wide ozeleniye of urban territory with finishing/bringing the norm of public green cultivations to 30 mm^2 to inhabitant (including the gardens of city blocks) with their distribution is evenly on residential territory and by organization along the large channels of the planted greenery bands, which create single system.

Introduction into the system of the urban communications of the high-speed/velocity directions of urban roads and high-speed/velocity rail transport, that make it possible to bring the mean time of report/communication with the basic places of the application/appendix of labor and the place of stay to 30 minutes.

Development of urban water pipe taking into account the provision for necessities for water of industry, and also the irrigation of green cultivations.

Building urban canalization/sewerage with the full/total/complete biological purification of waste water, special grid/network of

enclosed drains for the removal/distance of atmospheric wateres, a further improvement in the organization of the decontamination of city.

Wide irrigation of urban territoriii by building large basins, grid/network of small basins and nekoratiynykh channels.

Further development of the power delivery of city with the provision for the local equipment/devices of air conditioning in production, public and habitable buildings, with the partial application/use of an electrical heating in private life, with the prospect for the gradual exception/elimiration of gas from domestic demand. In this case, is provided for the thermofication of city because of the expansion of the existing heat and power plant and building a series of the large regions of boiler rooms.

As a result of earthquake 26. Apr. 1966 and of a series of the aftershocks, appeared the need for the review of the basic condition/positions of the general lay-out for city and project of the planning of pigorodnoy zone.

For providing the further systematic, economically substantiated and composite development g. of Tashkent, the fastest liquidation of the consequences of earthquake, increase in the level of the order of city and creation of the most favorable working conditions, mode of life and rest of population, the Council of Ministers of the USSR

bound the Council of Ministers of the Uzb.SSR to introduce refinements into the general lay-out for the development of Tashkent and affirmed the basic condition/positions which they provide for:

The number of population of city in its designed boundaries to the calculated period is 1400 thous. people.

Building-up of city in essence by I-graduated houses, building 7-9-graduated houses within limits of 10o/o, 2-graduated 5-7o/o.

Territorial development of city within the limits of the urban feature, established/installed by the confirmed general lay-out, with its further expansion because of connection to the city of the adjacent Earth and by redundancy in suburban zone g. of Tashkent the most favorable in town-building relation territories.

In the period of building the prvoy turn of city in essence to carry out re-planting, irrigation and order of the center section of the city, and also to complete building the complex of administrative buildings on the area im. Lenin.

Page 650.

Basic improvement and the further development of the system of the transport main lines of city, building high-speed/velocity roads and main lines of continuous motion, which ensure convenient transport

communication/connections between new residential areas, and also with industrial regions and the center of city. Sovershenstvovani of the system of urban mass passenger transport with the introduction of high-speed/velocity lines, and in prospect - subway.

The correction of general lay-out [1], completed in 1968, required a change in the calculated quantity of population and percentage relationship of the building-up of different height, but hence - the calculated value of the territory of city and direction of its development.

FOOTNOTE [1]. Author's brigade: L. T. Adam, A. T. Apsalyamov, A. K. Arzumanov, A. I. Vank (main project engineer), V. N. Varaksin, A. V. Gauzen, N. Yu. Gorshteyn, Z. Ye. Grishin, N. V. Gusev, A. Irkabaev, M. Lifanovskaya, A. Maltsev, V. Medvedev, V. M. Mil'charskaya, M. Mikhaelyan, L. Peryazav, L. Pradannaya, S. Protasius. ENDFOOTNOTE.

An increase in the territory of city to the calculated period required the review of the boundaries of suburban zone.

In view of the generality of the national economic interests of an entire right-bank part of the Chirchikskoy valley, unity of many branches of the economy of the region in question (irrigation, transport, power systems, the zones of rest etc.), of the position g. of Tashkent as the greatest industrial, administrative and cultural center, the development of city is examined in the composition of

agglomeration. Therefore would appear the need for the development at least of the preliminary diagram of the razvigiya of Tashkent agglomeration, as a result of which was reexamined number of questions concerning the prospect of developing of suburban zone and number of population, systems of engineering instrumentation, organization of the rest of population etc.

After earthquake 1966, are introduced the changes into volumes and the arrangement/permutation of the initial building like. The housing fund of city on the calculated period is determined into 17 million m² with the norm of the security of one inhabitant by dwelling space 12 m².

Completing this program is provided taking into account the high People's economic value of the mastered under building adjacent to city agricultural Earth. Is suggested arrangement/permutation to the calculated period of approximately 7 million m² dwelling space, i.e., 53o/o of new housing building, in city because of the reconstruction of the regions of the single-stage starcslczhivsheysya building-up. This will require the removal/drift of housing fund in size/dimension of 3 million m² or 41o/o of existing housing fund (single-stage habitable houses of the old building-up, the stay in which is dangerous due to a small seismic stability).

Population g. of Tashkent is accepted to 1970 it it will achieve 1400 thous. people, i.e., calculated. Therefore even now is necessary

strict limitation of a further increase in the number of population who only because of natural increase can achieve to the calculated period of approximately 2 million people.

For the stabilization of the number of population of city, improvement in the sanitary state of urban territory, and also according to architectural-planning considerations is provided for the conclusion/derivation into promrayony or beyond the limits of the city of a series of the industrial plants gradoobrazuyushchego value. Is projected the development of the enterprises of construction industry, light/lung and food industry.

The development of the existing industrial enterprises pedpolagaetsya because of the perfection/improvement of technology of production, modernization of instrumentation, specialization and cooperation of enterprises, automation of production processes.

Page 651.

Large natural and mechanical increase populations g. of Tashkent, and also the limited territorial resource/lifetimes dictate the need of developing existing, and also the creations of new cities for the limits of the Tashkent agglomeration, where it is necessary to place the industrial plants, which gravitate to Tashkent. This will make it possible to carry out the arrangement/permutation of industry in Tashkent taking into account the technical and economical comparisons

of the versions of the People's economic effectiveness of building these objects in Tashkent or in other cities of agglomeration, and also composite to solve the questions of transport, irrigation, engineering instrumentation, supply of the population of cities with products etc.

As a whole the taken in general lay-out (1966) planning organization of city is retained and in the corrected project. With the maximum preservation/retention/maintaining of entire fundamental building-up and technical-engineering equipment/devices, it considerably changes the formed structure of the plan/layout for city.

Entire territory of city is dismembered by the system of the water-green bands, which go along the river-beds of the basic channels. one of them, that passes along channels to Bozsu and Burdzhar, intersects entire city from northeast to south west and unites the center of city with the basic townspeople park/fleets and other places of rest. This band divides city on the eastern and western parts each of which in turn, is divided into a series of planning regions. The second composition axis is designed in the direction staroslozhivshikhsya centers of the western (" old") and eastern (" new") parts of the city. Along it is arrange/located the townspeople center.

Entire territory of city is divided by nine planning regions, with the body-fixed system of the main transport arteries with

townspeople center, by industrial regions and the zones of out-of-town rest. The public centers of planning regions adjoin the basic transport arteries, which connect them with the townspeople center which is arranged on water-greenmu cascade/stage to Bozsu, also, along the latitudinal composition axis of city (from the garden of revolution to the area im. Akhunbabaeva).

At the intersection of two axes of city, is placed administrativnopravitel'stvennyy center, to the east from which is outlined the commercial and cultural-educational zone of center, and to west is outlined the zone of sport and entertainment institutions. The territory of center is covered by the system of the distribution manifolds of townspeople value, which makes it possible to maximally free center from transport.

One of the main transport arteries, passing through entire western part of the city, begins from large uzbek circuit, it passes along promrayona, through the planning region of Chilanzar, along the western boundary of townspeople center, further through the northern-western and northern planning regions emerges to Chimkentskiy circuit.

Two other transport arteries - the Shota of Rustavli and cargo, that pass on the southeasterly part of the city, also unite large industrial and planning regions and centers. Transport arteries - st. of Titova and Gorkiy - connect the industrial and planning regions of the southeast and east through the central planning region with the

regions of west and northwest.

Around the public center of each planning region, are arrange/located the residential areas with population 20-30 thous. people who, in turn, are dismembered by the transport main lines of townspeople and district value for city blocks.

Page 652.

one of the basic town-building problems, placed in new general lay-out, is the maximum enrichment of the landscape of city by the creation of the broad ozelennykh bands along the river-beds of channels to Bozsu, Salar, Kal'kauz, to Aktepe, Karasu, Karakamysh, etc., the introduction of large green masses to the center of city, re-planting and irrigation of large ravines.

The territory of central planning region has a zone of public building-up within the ring of main lines navoi, as first-of-May, Uzbekistanskoy, western designed street, also, beyond its limits.

Townspeople center includes the government administrative institutions of Republican, regional and urban value, scientific research and designed organizations, educational institutions, and also the full/total/complete complex of the institutions of the cultural and general services of urban value. The arrangement/permutation of these institutions and institutions is

based on the principle of the creation of the clearly limited on territory functional zones taking into account the already available supporting/reference buildings and the constructions: the complex of sport-entertainment constructions is arrange/located in the zone of the existing stadium of "Pakhtakor", and central recreation park, taking into account the relief and hydrogeological conditions, which restrict the possibility of capital construction, is arranged in the band between streets Uzbekistanskoy and Navoi.

Townspeople center has the developed form, occupies vast territory and in planning relation it is the combination of areas, avenues, avtostoyanok, free spaces, transport node/units and main-line streets.

The building-up of center is solved in the form of the system of the ensembles, arrange/located both on the water-greenmu cascade/stage to Bozsu and along its composition axis, which coincides with the latitudinal composition axis of city. It begins from the garden of revolution, further it goes to administrative-government center - to the area im. V. I. Lenin - in the form of the latitudinal pedestrian esplanade (to 160 m), arrange/located between the existing streets Communist and K. Marx.

Administrative government center is solved in the form of the complex of three large buildings: the "-graduated house of government, hall of the conferences of the Presidium of the Supreme

Soviet and 19-graduated building of committee.

Further pedestrian esplanade intersects channel to Bozsu and passes through the townspeople sport complex of "Pakhtakor", which consists of large sport nucleus to 100 thous. spectators, the palace of sport to 10-12 thous. people, winter swimming pool etc.

To north from sport complex, are arrange/located the panoramic cinema in 2200 places and youth's house. Hence pedestrian lane goes past telecast station, through the park complex - to the south st. the ravci - emerges to staroslozhivshemusya center of the western part of the city.

The territory of townspeople center (320 hect.) is covered by the system of the distribution manifolds of townspeople value.

Within the limits of water-green axis to Bozsu is provided the arrangement/permutation of the separate/individual ensembles of the predominantly in a cultured way-entertainment designation/purpose which on north are completed by the complex of VDNKh [- Exhibition of Achievements of the National Economy of the USSR and by park/fleet "conquest", but in south - by the park/fleet of the name of Leninist komsomol.

By the project of the center section of the city predusmagrivaetsya the inclusion into the common/general/total

composition of a series, monumental, artistic constructions, which reveal the ideclogocal and political content of historical places, mass-political and revolutionary events.

In the general lay-cut for city, is develcped the diagram of subway from e-x of those intersecting in the center of the city of the diameters of common/general/total extent of approximately 60 km.

Page 653.

These diameters connect the center of city with the largest residential areas, the industrial , existing and design/projected auto depots of suburban and international communication, railroad station and the cessations of suburban trains. In the zone of pedestrian approach per kilometer to the stations of subway, will settle themselves about 50c/c of calculated number populations.

The first turn of building the metro must pass in the direction Chilanzar- the center of city - Academgorodok. In the zone of pedestrian approach per kilometer to the stations of the starting/launching section of Chilanzar - center the cities will be settled 200 thous. inhabitants, the calculated passazhiropritck on this section is 20-22 thous. the passengers in hour "peak" in one direction. During the full/total/complete completion of building the prvoy turn of the metro, the passazhiropritck will comprise more than

30 thous. people in hour in one direction. By project is provided for also the considerable development of the ground-based forms of public transport - about 8 km the lines of streetcar, more than 200 km - trolley bus and 400 km - bus.

Are proposed the following urgent measures, which form the principle of the transport system of city.

Creation of the main line, which connects the south-west and northwestern parts of the city because of the expansion of prospectus Furkat and punchings st. Ahmet Darysz.

Building cargo road along railroad main line on the sections: from st. Farkhadskoy to st. terminal and from st. of Kuibyshev to st. K. Marx.

Building high-speed/velocity road on st. of Gorkiy from st. General Petrov, along the northern boundary of the center of city with outcrop into the projected habitable mass of Karakamysh.

Building understudy st. Pushkin with the advent of the main line of polukol'tsovogo direction in the streets Volodarskogo, Sofia's, the General of Uzakova and further to st. Farkhadskoy.

Building the second outcrop to the center of city from Chilanzarskogo planning region on continuation st. of the Gafura of

Gulyama with expansion st. of Samarkand-darbaza. Connection/compound st. of Rustavelli's Shota with st. navoi because of reconstruction st. first-of-May.

For an improvement in the maintenance of population by public trasnportom project is recommended building the lines of streetcar on st. of Samarkand-darbaza, and also to the side of the masses of Karakamysh, northern and south eastern.

The questions of the engineering instrumentation of city - water supply, canalization/sewerage, heat supply, gas supply, power supply and telephone communication - in project are developed taking into account conformity to the outlined scales of the development of city and to the required level of komfortnosti habitable the building-up and the territories of city.

It is initiated vnedreni into the practice of building the city of the packing of engineering communications in common/general/total passage collector/receptacles. In the future there is in form to develop the composite diagram of utility networks to entire city taking into account collector packing.

General lay-out provided the solution of the complex of the questions of engineer training the territory of the city: the development of irrigation, building drainage in the mastered territories with the close standing of the level of ground water, the

order of ravines with wide re-planting, the acceptance of the measures of fight with further ovragoobrazovaniyem, the creation of the system of shower canalization/sewerage. Moreover in the future there is in form to carry out the glazes of green cultivations by the system of overhead irrigation and subsurface irrigation in essence in the public centers of city, creating on individual sections microclimatic conditions by building flowing basins, fountains etc., and also in the residential areas where is impossible the open sprinkling grid/network.

Page 654.

The system of overhead irrigation and subsurface irrigation is auxiliary and must work in parallel with irrigational system.

In recent years literally is transformed the appearance of city. On Chilanzare, in center, Karakamyshe, the north-east, the south-east - everywhere are maintained unprecedented according to scales construction work; Tashkent wholly it was converted into construction site.

Now in Tashkent pass/return on the average two houses into days. By five-year plan/layout provided to yearly put into operation more than 25 thous. of apartments. In 1970 housing fund of city will increase two times. Will be by this time constructed schools to 95 thous. learning, children's garden-creche to 45 thous. children, the

hospitals on yOtys. of cots is created the grid/network of culture-and-welfare and medical institutions, commercial enterprises, sport constructions, prostsektov and streets by common/general/total extent more than 50 km, bridges, overbridges, the complexes of all forms of utility networks etc.

Is completed building "-graduated administrative building on the area im. V. I. Lenin (first turn of the reconstruction of this area), academic theatre of the drama im. the Khamzy, covered artificial cylinder on university area, the first turn of habitable city blocks in the center of the city: Ts-13 - between the streets of M. Gor'kiy, U. Yusupova, Khurshid, Novoalmazarskoy, designed and constructed by the residents of Leningrad. Ts-7 - between the streets of V. I. Lenin, Titova, Shota of Rustavelli, Taras Shevchenko, Uzbekistanskoy, designed and constructed by the Ukrainians, Ts-4, Ts-5 - between the streets of F. Engels, Khurshid, V. I. Lenin, by A. Navoi, zaproyektirovanykh and constructed by the builders of the RSFSR, Ts-1, Ç-2 - between streets first-of-May, Soviet, im. the Khamida of Alimdzhana, A. Tolstoy, designed and constructed by the Muscovites; many habitable city blocks of Chilanzara, Karakamysha, north-east, south-east, designed and constructed by tashkenttsami, the Muscovites, the residents of Leningrad and all sister republics of our country; lane of parades, passing through the area im. V. I. Lenin from st. A. Navoi to st. Uzbekistanskoy, continuation st. A. Navoi from channel to Bozsu to st. F. Engels with tram and bus lines, st. Samarkand from st. acad. Sulaymanovoy to st. A. Navoi, st. of Rustavelli's Shota from

melting field-engineer tc st. of Taras Shevchenkc, st. Bogdan Khmel'nitskiy from st. of Rustavelli's Shcta - through the cverbridge tc air terminal etc.

Is completed building the house cf mclcdczhi on st. Bakhtakorskcy, 19-graduated administrative building on the area im. V. I. Lenin, 18-graduated hotel in the garden cf revclution, restaurant "uzbekistan" in 2500 landing places on st. cf K. Marx, buildings of Obkcm and Gorkcm the CP Uz cn theatrical area, cirque on the melting cf Khcdra, greatest universal store on the melting im. Akhunbabaeva. Museum cf art cn st. prcletarian, cinemas, commercial enterprises, the medical institutions, etc.

Are design/projected and are constructed the buildings cf executive committee cn st. Leningrad, fcur 19-graduated buildings between st. cf A. Navoi and Bratskoy - the ccmplex cf Ministry/departments, the library im. A. Navci, hotel in 1000 places, tc GlavAPU with his designed institutes; is carried out the reccnstruction and the expansion of the sport ccmplex of "Pakhtakor" with the palace of sport; the hcuses cf the scientists, house of ccmposers on st. the Uzbekistanskoy, the theatre cf the drama im. M. Gcr'kiy, three-auditorium cinema and the theatre cf dolls on st. Khcrezm and im. K. Marx; The Republican palace cf pioneers in the future central recreation park between st. A. Navoi. Is. Furkat, the Uzbekistanskoy, the theatre cf young spectatcr and ccnservatory along st. Furkat, large residential areas and city blocks, avenues, large

prospecti and the main lines of high-speed/velocity motion - st. of M. Gor'kiy, Ahmet Danysz, Titova.

Page 655.

The created recently products of architecture in ideological and artistic relation are characterized by a fundamental understanding of the designation/purpose of architecture and its problems, by clarity of architectural-three-dimensional/space composition, by the advisability of structural/design principle, by laconicism and the noble/precious simplicity of architectural form, by the bright optimistic system of entire construction as a whole.

Since the future of city is embedded today, necessary to dwell on some questions of the practice of design and building. In the contemporary stage of the reconstruction of Tashkent the basic problem is the creation of the greatest urban ensembles. Building the center of city with the developed grid/network of prospecti, avenues and grandiose park/fleet where will be arranged new government and administrative buildings, theatres, hotels, libraries, is considerable phenomenon in town-building practice.

If recently the reconstruction of the center of city in essence was reduced to selective building-up in the different parts of the center, then now it encompassed entire central city distric. Is placed beginning to connection/compound with the center of the city

through large prospecti into the single three-dimensional/space-developed composition of the formed and newly created residential areas (Chilanzar, Karakamysh, the Yunusabad, high-voltage, rice). Increasingly more perceptibly becomes composition the merging/coalescence of two historically formed centers - the garden of revolution and area im. Akhunbabaeva.

In the process of the reconstruction of city, zaemny staroslozhivsheysya single-stage building-up by large houses appear the complex problems by resolution of the artistic appearance of city taking into account new architectural scales and the methods of building-up. However, the practical solution of these problems not bygone sufficiently fundamental and by scientifically substantiated. the architectural-planning structure of a series of large regions (Chilanzar, the north-west, the south-east) has insufficiently clearly expressed structural communication/connections with the center of city and the adjacent regions, in their composition little is considered the position in the structure of city, as a result of which in their architectural construction there is no clear composition project.

Therefore in the future it is necessary to determine in the structure of city the most critical in town-building relation places, called to form/shape the architectural appearance of city, to determine the system of the main structural streets, which are composition principle for the large planning regions, which connect them with the center of city and between themselves. The problem of

the three-dimensional/space composition of building-up and silhouette of city can be correctly solved on wide town-building principle taking into account the local special feature/peculiarities on the basis of the considerations of economic advisability.

The principles of the architectural-artistic organization of building-up must be laid into the nomenclature of the series of standard projects. Nevertheless scientific research and designed institutes, develop/processing the series of standard projects, are not guided by this basic condition/position. As a result the created series of the standard projects of habitable houses of architectural-artistic relation consist of one house (usually, the series of standard projects consists of 4-5 houses, which are distinguished between themselves only along the length of house). Therefore house-building combines, until now, discharge the only one type of habitable house.

Page 656.

The volume of large-panel housebuilding as a whole on city increases 2-3 times, i.e., it becomes the ruling form of building in all city districs, including its center. The industrialization of building is a guarantee of the full-valued solution of town-building problems, creation of the indicative architectural appearance of city. To attain this, by applying one standard project, is impossible.

1156

It is necessary to discharge the series of the standard buildings of in-house production, which are distinguished between themselves by height - 2, 4, 7, 9 floor/stages, the extent, by the great possibility of the blocking of buildings, different in height, in principle with the different types of summer locations, and also the finishing of wall panels, and solutions of inlets, balconies, and of enclosure/protections, sun-protecting equipment/devices and location are window apertures, etc.

Everything still exists handicraft the primitive on architectural-three-dimensional/space solution masses of building-up. Instead of the creative use of the local special feature/peculiarities, which make it possible to give individual features to the built region, the designers resort to the schematization of the methods of building-up, the stamped solutions in which one motive is repeated many times, which leads to inadequacy of expression and uniformity.

To the architecture of the Soviet cities, in particular the city of Tashkent, it must be characteristic to individual'not'.

The individual features of the architecture of Tashkent, it is natural, they must be developed in the process of creative searching, research on the centuries-old progressive traditions of people, experiment of multinational Soviet architecture, entire progressive in foreign architecture. Contemporary architecture international, but at

the same time it must consider the local special feature/peculiarities. Specifically, naticnal contributes to the mutual enrichment of the culture of peoples. These and other problems of the formation of peculiar appearance g. of Tashkent must be based on the comprehensive scientific analysis of the contemporary and promising social, ekonomicheskicheskikh, town-building and other requirements.

Architecture is people art in the quite wide sense of this word. "Predstav'te to itself; he spoke outstanding Soviet architect I. V. Zholtovskiy, that to you did not like itself the book, you plot it to the side and will not more read. No one will force you to listen to uninteresting musykal'noye product or to look at that which was talking to artist picture. Another matter - building. Past it it is necessary to walk, to live in it or to work, from it not otverneshsya and about it you will not forget. The creation of the hands of architect to all the long years of its existence will be carried to the law court of people. It can racvat' or suppress people by its forms, proportions, location, decorate their life or vice versa, spoil it by the inconveniences of vnutenney planning. And in this the measure of the estimation of the labor of the architect that constant/invariably participates - although about this sometimes they forget even architects themselves - in each vi al step/pitch of man".

Large problems will cost before architects. They must attain the more advanceed solutions of the functional, technical, economic and

1158

artistic problems of the architecture of city are sharply raise its qualitative level.

Page 657.

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